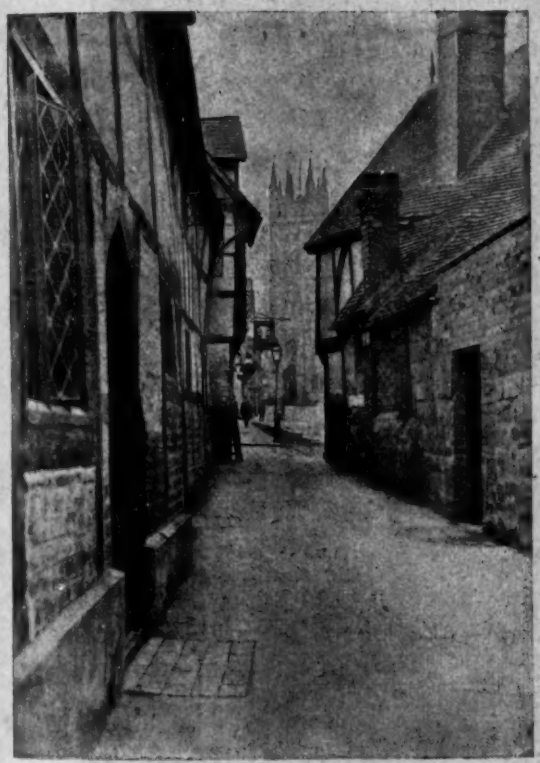
FRY'S PURE CONCENTRATED COCOA.

THE PRACTICAL TEACHER



St. Mary's, Warwick.

CONTENTS

OF THE

SEPTEMBER NUMBER

	PAGE
EDUCATION IN PARLIAMENT	115
BY MANY HANDS	117
N.U.T. NOTES	118
NOTES FROM THE NORTH	119
SUGGESTIONS FOR THE CONSIDERATION OF TEACHERS	121
THE PHYSICAL EDUCATION OF INFIRM CHILDREN. By H. Rippon-Seymour	122
THE TRAINING OF PUPIL-TEACHERS	123
THE TEACHING OF DOMESTIC SCIENCE IN THE UNITED STATES	124
MR. SWINBURNE'S NOVEL (Review)	126
NATURE NOTES FOR THE MONTH—ANT CULTURE IN THE SCHOOLROOM	128
NOTES OF LESSONS ON APHIDES	130
OUR ILLUSTRATED GEOGRAPHICAL NOTE-BOOK: BORNEO	132
NOTES ON AN EXPERIMENTAL COURSE OF LESSONS ON AIR AND WATER. By E. J. Russell	134
OBJECT-LESSONS IN HISTORY: WARWICK	135
THE FORMATION OF PARLIAMENT. By Henry Smart	138
ASTRONOMICAL PROGRESS	141
TRAINING IN CITIZENSHIP	142
THE N.U.T. EASTER CONFERENCE, 1906	143
OUR MODEL INFANT SCHOOLS: AN APPRECIATION	144
A SONG OF SPRING (Words and Music)	147
SCHOOL GARDENING FOR LITTLE CHILDREN	149
FRENCH AND GERMAN FOR SCIENCE FACULTY IN LONDON UNIVERSITY	150
FRENCH GIRLS' SECONDARY SCHOOLS—II.	151
BRITISH ASSOCIATION MEETING IN SOUTH AFRICA	153
OUR PUPIL TEACHERS' AND SCHOLARSHIP COURSE. By A. T. Flux	154
OUR CERTIFICATE COURSE FOR 1906. By George Collar	159
MATHEMATICS	162
CHEMISTRY. By C. A. West	163
PHYSIOGRAPHY	164
OUR QUERY COLUMN	165
THE EDITOR'S TABLE	167

·VOL· XXVI No 3

EDITORIAL, PUBLISHING AND ADVERTISING OFFICES OF "THE PRACTICAL TEACHER"
T. NELSON & SONS, 35 and 36 Paternoster Row, London, E.C.
EDINBURGH, DUBLIN, and NEW YORK

PRICE 6D.

NOW READY.—The Practical Teacher's "Art Monthly" for September. Price 3d.
ORDER OF YOUR BOOKSELLER TO-DAY.

BLACKWOOD & SONS' NEW EDUCATIONAL WORKS.

A NEW SERIES OF READERS.

THE STORY OF THE WORLD. In Five Books. By M. B. Synge, Author of "Stories from European History," etc., etc. Coloured Frontispiece, numerous Illustrations and Maps. Book I.—On the Shores of the Great Sea, 1s. 4d. Book II.—The Discovery of New Worlds, 1s. 6d. Book III.—The Awakening of Europe, 1s. 6d. Book IV.—The Struggle for Sea Power, 1s. 9d. Book V.—Growth of the British Empire, 2s. **Prize Edition,** complete in two volumes, 3s. 6d. net each.

Uniform with the Above.

THE WORLD'S CHILDHOOD. In Two Books. Suitable for Standards I. and II. Fully illustrated. Price 10d. each.

Blackwood's Literature Readers.

Edited by John Adams, M.A., B.Sc., F.C.P., Professor of Education in the University of London.

Book I., 208 pages, price 1s. Book II., 275 pages, price 1s. 4d. Book III., 303 pages, price 1s. 6d. Book IV., 381 pages, price 1s. 6d.

JUST PUBLISHED.

Byron—Selections. By Professor Wight-Duff, M.A. 3s. 6d.

Stormonth's English Dictionary. Pronouncing, Etymological, and Explanatory. An entirely new edition. Re-edited and Re-set.
I. School and College Edition. Crown 8vo, 1100 pages, 5s. net.
II. Handy School Edition. 16mo, 2s.
Educational News.—"Possesses, in copious selection of words, and keenness as well as clearness of definition, high worth—as a concise, accurate, and full treasury of the most useful vocables in the English language."

A German Reader for Technical Schools. By E. F. Seckler. 2s.

A History of English Literature. By J. Logie Robertson, M.A. 3s.

Outlines of English Literature. By the same. 1s. 6d.

Paraphrasing, Analysis, and Correction of Sentences. By D. M. J. James, M.A. 1s. Also in Two Parts, 6d. each.

The School Anthology (Chaucer to the Present Day). By J. H. Lobban, M.A. In Two Parts, 2s. each. One Volume, 4s. Prize Edition, 5s.

Forty Elementary Lessons in Chemistry. By W. L. Sargant, M.A., Headmaster, Oakham School. Illustrated. 2s. 6d.

Inorganic Tables, with Notes and Equations. By H. M. Timpany, B.Sc., Science Master, Borough Technical School, Shrewsbury. Crown 8vo, 1s.

Blackwood's Illustrated Classical Texts.

Cæsar—Gallic War, Books I.-III. 1s. 6d. **Cæsar—Gallic War, Books IV., V.** 1s. 6d. **Cæsar—Gallic War, Books VI., VII.** 1s. 6d. With or without Vocabulary.
Xenophon—Anabasis, Books I., II. 1s. 6d. **Horace—Odes, Books III., IV.** 1s. 6d. **Livy—Book XXVIII.** 1s. 6d.

A First Latin Reader. With Notes, Exercises, and Vocabulary. By K. P. Wilson, M.A., Fettes College. Crown 8vo, 2s. 6d.
First Latin Sentences and Prose (with Vocabulary). By K. P. Wilson, M.A. 2s. 6d. Also in Two Parts, 1s. 6d. each.
Lower Latin Prose. By K. P. Wilson, M.A. 2s. 6d.
Higher Latin Prose. By H. W. Auden, M.A. 2s. 6d.
Higher Latin Unseens. By the same. 2s. 6d.
Lower Latin Unseens. Selected, with Introduction, by W. Lobban, M.A., Classical Master, Girls' High School, Glasgow. 2s.

Greek Accidence. For Use in Preparatory and Public Schools. By T. C. Weatherhead, M.A. 2s. 6d.
The Messenian Wars. An Elementary Greek Reader. By H. W. Auden, M.A. 1s. 6d.
All French Verbs in Twelve Hours. By A. J. Wyatt, M.A. 1s.
A First Book of "Free Composition" in French. By J. Edmond Mansion, B.ès L., Royal Academical Institution, Belfast. 1s.
The Children's Guide to the French Language. By Annie G. Ferrier. 1s.
Spartanerjunglinge. A Story of Life in a Cadet College. By Paul von Szczepanski. Edited, with Vocabulary and Notes, by J. Morrison, M.A., Aberdeen Grammar School. 2s.

Full Educational Catalogue sent post free on application to

WILLIAM BLACKWOOD & SONS, 45 George Street, Edinburgh; and 37 Paternoster Row, London, E.C.

SCHOOL GOVERNMENT HANDBOOKS

(TWENTY-FOURTH YEAR OF ISSUE)

THE SCHOOL GOVERNMENT EDITION AND MANUAL

OF THE

CODE for ELEMENTARY SCHOOLS, 1905-6

(School Government Handbook No. VI.)

This "Edition" supplies to every School and every Education Office a cheap and handy annual volume of necessary and useful information.

Price for 1 to 49 copies . . . 1s. each.	Price for 100 to 149 copies . . . 10½d. each.	Price for 200 to 249 copies . . . 9½d. each.
" " 50 to 99 " . . . 11d. "	" " 150 to 199 " . . . 10d. "	Above these quantities . . . . 9d. "

Postage on single copies, 3d. extra. These Prices are strictly net.

THE FULL TEXT OF THE NEW SUGGESTIONS TO TEACHERS AND OTHERS CONCERNED IN THE WORK OF PUBLIC ELEMENTARY EDUCATION IS INCLUDED IN THIS MANUAL.

The School Government Handbook—No. X.

BEING THE SCHOOL GOVERNMENT EDITION AND MANUAL OF THE

REGULATIONS FOR SECONDARY SCHOOLS, 1905-6

With other cognate information; compiled, corrected, and arranged for the use of Education Authorities, Governors, Officers, Correspondents, Inspectors, Headmasters and Headmistresses, Teachers, and others connected with Public Education.

Single Copies, 1s.; Post Free, 1s. 1d. Quantities of 12 and over, 6d. each.

The School Government Handbook—No. XIII.

BEING THE SCHOOL GOVERNMENT EDITION AND MANUAL OF THE REGULATIONS, &c., AFFECTING THE

TRAINING OF TEACHERS, 1905-6

INCLUDING THE

PUPIL TEACHER REGULATIONS AND THE TRAINING COLLEGE REGULATIONS

WITH OTHER COGNATE INFORMATION.

Single Copies, 1s.; Post Free, 1s. 1d. Quantities of 12 and over, 6d. each.

The School Government Handbook—No. XV.

THE SCHOOL GOVERNMENT EDITION AND MANUAL OF THE REGULATIONS (1905-6) FOR

Evening Schools, Technical Institutions, and Schools of Art and Art Classes

WITH OTHER COGNATE INFORMATION.

Single Copies, 1s.; Post Free, 1s. 1d. Quantities of 12 and over, 6d. each.

London: The School Government Chronicle, 21 New-Bridge Street, E.C.; Manchester: 46a Market Street.

THE

PRACTICAL TEACHER

A MONTHLY MAGAZINE AND REVIEW FOR THE SCHOOL-ROOM AND THE STUDY

Vol. XXVI. No. 3. SEPTEMBER, 1905. Price 6d.

NOTICES TO CORRESPONDENTS AND SUBSCRIBERS.

"THE PRACTICAL TEACHER" may be ordered of any Newsagent or Bookseller, or at any Bookstall, in the United Kingdom or in the Colonies. Supplies are sent monthly to the chief towns in Australasia, South Africa, and India.

LONDON OFFICE: 35 and 36 Paternoster Row.
EDINBURGH OFFICE: Parkside Works.
DUBLIN OFFICE: 17 Talbot Street.
NEW YORK OFFICE: 37 East 18th Street.
PARIS: W. H. Smith and Son, 248 Rue de Rivoli.

Subscribers may obtain "THE PRACTICAL TEACHER," post free, from the Publishers at the following terms:—

United Kingdom, Continent, Colonies, and United States } 12 Months, 8/- 6 Months, 4/-

All literary communications should be addressed to the Editor, Office of "THE PRACTICAL TEACHER," 35 and 36 Paternoster Row, London, E.C.

Remittances, Cheques, Post-Office Orders, etc., should be made payable to THOMAS NELSON AND SONS. Advertisement rates on application.

EDUCATION IN PARLIAMENT.

NOBODY can say that the Scottish Education Bill died without a warning voice and presage here. By a kind of Gaelic second-sight, appropriate to the subject, we, in these columns, have often "uttered the pallid shriek of far-impending woe." We saw the Bill laid on its bier long before the Lord Advocate, as nearest friend and chief mourner, gave official notice of the funeral. Up to the last the friends of the deceased were hopeful, but not so we, though friends of it indeed. Even so late as the middle of July the Bill was taken out for an airing—a cruel kindness—yet dictated by a good motive. "Exercise," said the hopeful friends, "exercise is what the poor fellow needs." So, armed along by the Lord Advocate and Sir M. Stewart (a laird from Kirkcudbright), the poor thing was taken out for a few hours' walk. But pawky enemies lay in wait; the walk became an obstacle race, the exercise waxed too violent for an invalid. Writer to the Signet Black began the insidious assault. He wanted to refer the Bill to a Committee of Scottish Members and begin the matter again. "Home Rule!" cried the champions of a Parliament one and indivisible, and Mr. Speaker ruled Mr. Black straight out. Then up rose Lord Willoughby de Eresby, and everybody said, "What does *he* do in this galley?" for Lord Willoughby de Eresby is a Lincolnshire member, and (so far as we know) not a Scot at all. The few other English members regarded his speech as a bore and his "cheek" as phenomenal, for Scottish subjects are severely left to the sons of Caledonia stern and wild, as a rule. Lord Willoughby (if one may thus shorten his name) wanted to substitute "county" for "educational district." So did Sir C. Renshaw, so did the Earl of Dalkeith, son and heir of the Buccleuch. In sixes and sevens the other Scottish M.P.'s showed themselves at sixes and sevens about the matter, which took up one hour and a half. Luncheon was then discussed with equal vigour. Invigorated by luncheon, Mr. Caldwell (James of that ilk, the friend to cheap music-sellers) moved a comprehensive amendment, the effect of which would be to maintain in Scotland just the existing state of things, under which every burgh and parish has its own School Board. Mr. Wason (of Clackmannan and Kinross) stood up like a tower of strength to support Mr. Caldwell. So did Sir Robert Reid; so did Mr. Dalziel; so did Mr. T. Shaw; so did Mr. Dobbie; so did Sir Henry Campbell-Bannerman. A division was then taken, which brought the proceedings on to the hour of five. Another amendment, another division, and then the House adjourned, "it being half-past five of the clock" on a Friday. The Bill was taken back to bed exhausted, and it never recovered. It is a Bill which has had an uncanny experience—it has now died a second time. "Nobody wanted it except the Educational Institute of Scotland" was the requiem one heard in the lobby. According to the portents, if a change of Government occurs within the next six months, nobody will see a third incarnation of this particular Bill. Again let a word be said to the sapient; the Educational Institute ought to have a member of itself a member of Parliament too.

The Scottish Education Bill was officially buried on the last day of July, and the English Education Code was legally born on August 1st. On the latter day the debate on the Education Estimates took place, the football of discussion being kicked off by Sir William Anson. Ranked on the benches behind him, eleven Ministerial members occupied their seats; seven of them were sleeping while Sir William talked, one of the other four once cried "Hear, hear!" and two of the remaining three remonstrated with the cheerer, telling him in whispers that he would wake the happy seven. Messrs. Gray, Macnamara, and Yoxall looked as though they would like to be asleep themselves, and nothing but a keen sense of duty could have kept them awake during the first part of Sir William's very trying homily. Sir William—small, dry, wizened, donnish, painfully precise, utterly uninspired and uninspiring, and talking of public elementary education from the

point of view of a man who has spent thirty years in a cloister-like College and only five years in the House of Commons—is about the most terrible example of the "Oxford spirit" at its worst that the House of Commons has ever experienced. "These be thy gods, O Israel!" a harsh critic said as he listened to this academic and official "educationist" talking of education as though it was a dryasdust matter of Greek texts and law-books. In one part of his speech he was "mighty superior" as to training-colleges and their products; in another he deprecated the discipline which exists in public elementary schools; in a third he spoke of an university degree and a complete education as synonymous terms, and, generally speaking, he irritated his audience (all but the happy sleepers) up to almost an intolerable pitch. Sir John Gorst used to be irrational, paradoxical, and unreliable, but at least he was worth listening to; Sir William is not. "An elderly prig" one member of the Opposition rudely called him *sotto voce*, and another defined him as a hybrid—a don and an old woman. The subject of the debate in his hands became more depressing than a coffin, and the House wore a funereal air.

But he put forward two things which aroused attention. In the Code on the table there was a new Article (53 (*c*)) which prohibits a teacher of a grant-aided school from being a manager of a grant-aided school, his own or any other. But this, Sir William explained, is not to apply to teachers of grant-aided schools who are members of Education Committees, and as such are expected by their committees to share in the work of acting as council managers of schools. That is a dictum which will relieve a good many people, and Sir William ought to have the credit for explaining and removing the quandary which new words in the Code had incautiously caused. But what the listening M.P.'s present really listened for was the expected announcement as to "distressed school districts" and a special grant. East Ham, West Ham, and all the whole-hoggers in the matter of large school populations and high school rates listened for the promise of relief—everybody listened—there were many members of Education Committees for "distressed districts" present in the Strangers' Gallery, and they listened too, all ears. And what did they hear? A most pompously little announcement. "I will never ask for money, nominally for education, but really for the redress of the inequalities of our rating system, in order to do what an amendment of the rating law ought to do;" and, "I could not be a party to what is called robbing Peter in order to pay Paul, to taking money from rural districts and an appreciable number of urban districts in order to assist particular areas." The jaws of the whole-hoggers from the Hams at once were seen to drop. "*But*," Sir William went on, and they listened again, only to be disappointed, "there will be a uniform grant of 24s. for every child over five, and there will be the aid-grant and the fee-grant of 17s. for children under five. If any area think" (this is donnish English) "it is to their advantage to exclude children under five, they can do so. If they do not think it is to their advantage, they can retain children under five and obtain the grant." (Sensation.) "Thank you for nothing," said bitterly the whole-hoggers from the Hams.

Mildly Sir William looked round in wonder at the absence of applause. He did not seem to realise at all that this was the *ridiculus mus*. Months of scheming, calculating, congressing: stern resolutions by East Ham; threats of similar resolutions by West Ham, Tottenham, and other ancient Saxon villages of that ilk; great gatherings of councillors from distressed areas, in London; deputations of them to the Prime Minister; a general hope; an earnest expectation; a confident listening; and then—out crept this little, dry, donnish Ansonian mouse! "Just one of these peddling, piffling, footling proposals which irritate more than no proposal at all," a member said on the terrace afterwards. "Looking at it from the point of view of 'the Law and the Constitution,' abstract fairness, new rating laws at the Greek Kalends!—instead of considering the matter as one of those urgent questions of expediency and crisis with which statesmen exist to deal!" But that supposes Lord Londonderry and Sir William Anson to be existing statesmen, which they are not. They exist, it is true, but they are not statesmen; probably they are the two least adroit persons that ever held the offices they hold.

Mr. Gray arose in his wrath and slated the proposal. So did Mr. Louis Sinclair, fresh from another fine in respect of his motor-car. So did Dr. Macnamara, who explained to the House how inadequate the proposal is. But Sir William was not crushed, or indignant, or repentant; nothing short of Mr. Sinclair's motor-car would be able to crush him, there is so very little of him or his proposal to be crushed. Infinitesimal and impotent statesmanship had produced one more infinitesimal and sterile proposal—that was all. And the men in the Strangers' Gallery went growling home to their Hams.

Wales grew wroth with Sir William about another matter. Mr. Lloyd-George was anything but courteous to him, and threats of further revolt in the Principality were heard. But Mr. Gray had prophesied a worse thing—the Welsh revolt is nothing to the rebellion which Mr. Gray expects to arise in the Hams. A combination of the Opposition, the Irish, the Welsh revolters, and the Unionist whole-hoggers from the Hams, brought the Government majority down to 30; the clock struck midnight in a long-suffering way, the Code became law, and Education in Parliament for this session came to an end. There is no truth in the statement that Sir William Anson was guarded home by the police.

THE Board of Education announce that the Certificate Examination held for Teachers employed in Elementary Schools will take place, in 1907 and subsequent years, during December instead of during July, as has hitherto been the practice. This change is consequent upon the change in the date of the King's Scholarship Examination, 1907, and upon the date fixed for the Preliminary Examination for the Certificate, which will take the place of the King's Scholarship Examination in 1907. The Examination for Students in Training Colleges is not affected, and will continue to be held in July. The detailed Syllabus and Regulations for the Certificate Examination of 1907 will be issued shortly.

MISS PHILIPPA GARRETT FAWCETT, daughter of the blind political economist who was at one time Postmaster-General, has been appointed an Assistant to the Executive Officer of the Education Department of the London County Council. In 1890 this lady was placed above the Senior Wrangler in the Mathematical Tripos.

BRITISH MUSEUM

BY MANY HANDS.

"Quot homines, tot sententiæ."

THE following is an extract from a letter written, by a teacher, at the request of the Chief Inspector of Schools, Wellington, New Zealand. The lad referred to is attending the District High School, Masterton:—"He lives at Hamua, distant about six miles from the Newman Railway Station, which is itself about twenty-six miles from Masterton. He rides from his home to within a mile of Newman Station, and has to leave his horse there, walking the remaining mile. He has to leave his home every morning by 6.30 A.M., and arrives home in the evening by about 8.30 P.M. Although in winter he both leaves home and arrives there in darkness, he has not missed more than four half-days this year, and two of these were during the big snow-storm a month or two ago. He went with our team to Wellington to see the English match, and arrived home on Monday evening, or rather Tuesday morning, at 2.30 A.M. At 10 A.M. the same morning he was in his place in class. Twice he has fallen asleep in school, but his work is good all round, as a rule, and he is strong in Mathematics. As to character, I think so much of the boy that I often have him up at my house, putting in time, from 3.30 to 5.30 (train time). Often his horse has strayed and led him a merry dance, but he turns up serenely next day."

An Enthusiastic Scholar.

❧ ❧ ❧

CONSIDERABLE excitement has recently been caused by the pronouncement of Sir James Crichton-Browne that if people take reasonable precautions they ought to live a century. Statistics have been compiled by those who are fond of dabbling in figures showing how many people do actually reach a hundred, and the reputed ages of Old Parr and Methuselah have been discussed in this connection. The caricaturist in the *Chronicle* turns the theory to political account, and all sorts and conditions of men are wondering what they will be like at five-score. The teacher will have to look forward to thirty-five years of honourable retirement, and perhaps the size of the superannuation allowance indicates an expectation that the funds will have to be spread over a long period.

Living to a Hundred.

❧ ❧ ❧

IN relation to such a long expectation of life, it is wonderful that any one should dream that a man becomes unfit for appointment in a higher post, particularly as head-master of a public or secondary school, at forty. We know that assistant masters and other professional footballers generally have to give up the game by the time they reach that age, but the head-master generally leaves the athletics to his assistants. We can find no analogy in other trades, callings, or professions. The butcher and greengrocer who have successfully worked up a business in a small shop are not debarred by age from taking a larger one; the clergyman is not too old at forty for a call to a larger parish or a richer living; and very frequently a physician or barrister is only beginning to make a practice at that age. It is a question for school authorities to consider, as the thought that no advancement is possible after the age of forty must have a deterrent effect on the supply of teachers.

Too Old at Forty.

❧ ❧ ❧

THE name of Sir James Crichton-Browne brings to mind the days of the "over-pressure" controversy of twenty years ago. Sir James was the leader of those who condemned our school system as leading to over-pressure. Dr. J. G. Fitch, H.M.I., defended the Department and obtained a knighthood. As is usual on such occasions, champions made extreme statements and the man in the street understood them not. A boy, who pleaded illness as an excuse for absence, was asked by the writer what had been the matter with him, and replied, "Please, sir, I've had *the over-pressure*." The boy knew it was "the over-pressure" because his mother had told him so.

Over-pressure.

❧ ❧ ❧

THE resignation of the High Master of this celebrated school, which numbers among its scholars Milton and Marlborough, call to mind the educational work of the founder, Dean Colet. He was a great friend of Erasmus and other educational reformers of the end of the fifteenth and beginning of the sixteenth centuries. Although a Roman Catholic, his educational inquiries and freedom of thought led the clergy to persecute him. He devoted his money to the foundation of a school, which until about thirty years ago was carried on in St. Paul's Churchyard. Bearing in mind the number of fishes taken in the miraculous draught (St. John xxi. 11), he made provision for "a hundred and fifty and three" boys "of all nacions and countres indifferently to be taught free in the same in good literature both Laten and Greke." Under Mr. Walker, the High Master, who is retiring, the number of pupils has increased to about six hundred, although the foundation scholars, who wear a silver fish on their watch-chain, still remains at a hundred and fifty-three.

St. Paul's School.

❧ ❧ ❧

THE ceremony of prize distribution at this historic school is always called the "Apposition," a name which has puzzled a good many people. But taking the word quite literally it means a setting of one person against another, particularly for asking and answering questions. Hence a difficult question is still called a "poser," although the "poser" or "apposer" was originally the person who asked the question. In Pepys' *Diary* (Feb. 4, 1662–3) we read: "To Paul's School, and up to hear the Upper Form examined . . . Dr. Wilkins and one Mr. Smallwood, *Posers*." In Stow's *Chronicle* we read: "And often coming from schoole, when I mette her (*i.e.* Queen Elizabeth) she would *appose* mee touching my learning and lesson."

Apposition.

N.U.T. NOTES.

MORE urgent matters have prevented an earlier reference to the dangerous suggestion of the L.C.C. Inspectors "*that there should be one Head Teacher, and one only, in each school.*"

Combined Departments.

I do not deny that "the complete independence of the various departments, *e.g.*, boys', girls', and infants', into which the majority of the schools are divided, has some serious disadvantages, but I do strenuously combat the notion that these disadvantages are so great as to make educationists recommend the abolition of the head mistress. Possibly I am prejudiced in this matter, and do not view arguments in quite the right perspective. Yet those of the Inspectors strike me as more than ordinarily "thin": "It is still possible to find different schemes of arithmetic within the same school, and different schemes of writing, whilst a co-ordinated scheme of drawing, embracing the classes of the infant school as well as those of the senior departments, is hardly to be found anywhere. Finally, there is the great question of promotion from class to class." Well, any of the above can easily be set right by "conference," "co-ordination," and "correlation"—to use terms constantly in the mouths of the educational critic; and a humble outsider might be pardoned for inquiring what Council Inspectors are for, unless it be to secure the harmonious co-operation of all the teachers in the Council's service. In these pages, I need not labour the professional aspect of the question. Nothing could, however, be more disastrous for the London schools than the complete abolition of promotion for the most able class mistresses in girls' and infants' schools. The Inspectors are quite wrong in imagining that the supply of these teachers "depends rather upon a good commencing salary than it does either upon the maximum of salary, or possibilities of subsequent promotion." When the number of pupils under one head teacher becomes inordinately large, his time is entirely occupied "in completing forms, stock-taking, invigilation, and examining personally term-examination papers." These are the words of Mr. R. Blair, M.A., B.Sc., who, in a notable address to the London H.T.A., further said: "The head master was chosen for his post *because he was a good teacher*, and he is a most unwise head master if he lets his talents go rusty. He should keep his hand in, and show his staff how to do the work." It is because these gargantuan schools prevent so many of the best teachers in the country coming into direct personal touch with the children that *they must be opposed on educational grounds.*

MY duties as an Officer of the Union have, during the past few years, led me to many training colleges; but I am bound to say that I visit none with greater pleasure and all-round satisfaction than my old *alma mater*, St. John's College, York.

An Up-to-date College.

Five and twenty years ago, when I was a student there, it could hardly be deemed in the first rank of training institutions. To-day, however, judged from every conceivable standpoint it can hold up its head amongst the best. Its tutorial staff, from the talented Principal downwards, are all highly qualified men, the majority being, in addition, distinguished *alumni* of the older universities. Its lecture rooms, laboratories, workshops are all quite new and fitted up in the best possible style, whilst its "model school," opened by the Lord Archbishop of York, in November 1900, is a *real* model school, where teaching is carried on under almost perfect conditions. The school contains six beautiful classrooms, and a large central hall, and as the number of scholars is limited to 210, the students have a chance of acquiring the *technique* of their profession without the disciplinary strain inevitable with classes of seventy or eighty. Since 1899, improvements and enlargements have cost more than £12,000, and I am tempted to condole with the College Committee in being excluded from the benefits of the new College building grants. In 1901, the whole College was supplied with electric light, at a cost of £500, and also with a new heating apparatus and hot-water system, at a cost of £1100. A new wing has been built, with bedroom accommodation, for thirty additional students. It also contains two Masters' sets of rooms, bath-rooms, downstairs changing-room and shower-baths, smoke-room, common-room, gymnasium, and Masters' common-room. Lastly, for students unable to profess the tenets of the Church of England, there is a hostel, likely to become popular, pending the day when there shall exist a "conscience clause" in all public institutions largely maintained by contributions from the Imperial Exchequer.

A FEW days later than the publication of these "Notes" will take place at Liège an international congress of teachers—the first of its kind ever held.

An International Congress.

The initial week of September usually witnesses the Belgian Teachers' Conference, with its French, and Flemish and plenary sections. As far as I can learn, these are to be entirely abrogated in favour of the sessions of the International Congress, which will be open to—(1) The members of the patronage committee; (2) the delegates of the teachers' associations of foreign countries; (3) the members of the *Fédération générale des instituteurs belges;* (4) the persons invited by the organising committee. The N.U.T. will be represented by the President, Vice-President, Secretary, and Mr. Goldstone, and although the *personnel* of the deputation is quite unexceptionable, I think the Executive would have done wisely to confine its choice to those of its members possessing a good working knowledge of French. Mr. Ernest Gray, M.P., might fitly and gracefully have been included on an occasion which is unique. Any language may, of course, be used as the vehicle of thought at the Congress; but—and I cannot resist quoting the quaint phraseology of the official programme:—

> "However the memoirs authors, that have not written in French, English, Dutch or German ought to be compleated by an annex to in either of these four languages."

To ensure the compilation of a complete and correct record of the proceedings of the Congress, it is suggested that "the members who have spoken on any subject should communicate to the Secretary within twenty-four hours the summary of their speech." It may be not without interest to give the subjects for discussion

at this epoch-making gathering; and again I make use of the founders' diction :—

"1. The primary teacher, mission, formation, situation.

"2. Obligation of instruction. Is it necessary? Duration of the obligation. Sanction. Results obtained.

"3. Education of backward and abnormal children. (*a*) Organisation of schools for special instructions, for backward pedagogicals. (*b*) Where and when we must give professional education to backward children. (*c*) Personal formation of the special instruction. (*d*) The plan of physicians in the schools for backward pedagogicals. (*e*) Results of the experiences and observations made in the special instruction at the sight of the development of the pedagogical sciences.

"4. The instruction of the primary agricultural school. (*a*) How the primary agricultural school ought to be formed and understood. (*b*) The intuitif teaching to use.

"5. Material, hygienic and pedagogical questions in which the school must be. Number of pupils per class.

"6. What the school can do to bring the fraternite of the people and universal peace.

"7. Collaboration of the family and the school in the education, and the patronage of the children during and after the primary studies.

"8. Is there any possibility to institute an international office teachers Federation."

These questions are all-important and exceedingly well chosen. Many of them might, with profit and advantage, form the subjects of papers and after-deliberations at teachers' meetings in our own country.

THE last ordinary meeting of the Executive was characterised by one or two incidents of a particularly pleasing nature. On behalf of the members and the principal officials, the President of the Union presented to Mr. A. A. Thomas, B.A., L.C.C., whose marriage with Miss Jackman had taken place a few weeks previously, a handsome and valuable case of cutlery in recognition of the happy event. In handing over the souvenir, Mr. John alluded briefly to the main events of a career full of interest. He claimed the honour and responsibility of being, in a sense, Mr. Thomas's "Union godfather," since he had been the means of introducing him to Executive work, as a representative of the old South Wales District Union. I first met Mr. Thomas at the Leeds Conference in 1892, when the Finsbury Association's delegates took a notable part in the proceedings of the week. Afterwards, we were fellow-workers in the formation of the N.F.A.T., and he had the distinction of being the first metropolitan class teacher elected as its President. We were both successful at the 1895 Executive election, and since that date Mr. Thomas has never looked back. After four years' highly successful work as Secretary of the Examinations Board, he became Clerk to the Tenure Committee, and in that capacity is effectively carrying out a policy whose lines were originally and wisely laid down by Mr. Organ. It is perhaps too soon to hazard an opinion regarding his work on the London County Council. But one may safely conclude that the same sterling qualities which brought him to the top of the tree in professional organisations will enable him to make his mark in the premier municipal parliament of the universe. After the presentation to Mr. Thomas was duly completed, ex-President's badges were pinned (by Mrs. Thomas) on the breasts of Messrs. Yoxall and Gray, and each gentleman uttered a few felicitous sentences in acknowledging the gift.

More Presentations.

I LEARN from the last issue of "Quarterly Notes" that there is every hope that the aim of the Teachers' Provident Society—"2500 new members for 1905"—will be realised. Already, 1142 new members have been secured, as against 930 for the corresponding period of last year. Although this progress is extremely satisfactory, Mr. Golding reminds his workers that they must not take it for granted that the end has been attained and cease their labours. The annual exodus from the training colleges ought to supply a considerable portion of the thousand members still to be secured, and I notice that the Society, with commendable enterprise and forethought, now sends out a "Students' Special Issue" of its "Quarterly Notes." It is highly gratifying also to observe how general is the good feeling evinced towards the Society by the Principals of the various colleges. When one finds a gentleman writing: "I shall be glad to do all I can personally to bring the work of your Society under the notice of our outgoing students;" and a second, "I will call the attention of the students to the advantages offered by the Teachers' Provident Society;" and a third, "I will gladly do as last year, and afford facilities about your Provident Society,"—one feels that the Society can reasonably hope much from the newly certificated teachers.

"Quarterly Notes."

The special article this quarter is entitled "How I became a Landlord—By One who has Succeeded," and it is both interesting and helpful. I was specially struck with the reasons which led the writer to do business with the T.P.S. :—

"First and chiefly, being a novice, and not having had any dealings in this direction previously, I felt *I could thoroughly trust my own Society*, and although I knew nothing against the other Societies, yet they did not inspire me with that confidence that I had in the T.P.S.

"Secondly, and this reason weighed very considerably, I found that the rates charged by the T.P.S. compared very favourably with those on the other side.

"Thirdly, I imagined that I should get a larger advance from my own Society, where I was known, than I should from another Society unacquainted with me, and this eventually proved to be the case.

"Fourthly, the law costs were considerably below those of the T.P.S. competitors."

Seeing that the Board of Management are now prepared to advance up to *nine-tenths of the value* of the premises to those members who intend to reside in the same, there is even a better chance for every member who wishes, to become his own landlord. A. C.

NOTES FROM THE NORTH.

SIC itur ad astra. Authoritative announcement has now been made that the Scottish Education Bill of 1905, as I anticipated in last month's Notes, has been numbered among the "innocents" to be ruthlessly massacred on or about St. Grouse's Day. Two years of futile effort, of needless conferences and of weary pilgrimages to St. Stephen's have passed, and we may well sit down and take stock of the result. It were difficult to say how much harm has been done by these abortive Bills. School Boards have had the sword of Damocles hanging over their heads for two long years, with the

The Defunct Bill.

result—the inevitable result—that several of them have done practically nothing to keep themselves abreast of the requirements of their district with regard to school accommodation. Why should they, when their places were to be taken by County District School Boards, who, with greater funds at their disposal and a larger rateable area, would have undertaken the invidious task of assessing new and increased rates? They have in many cases, like Micawber, been waiting to see what would turn up; and now that nothing has turned up they are, like that worthy gentleman, "no forrarder." Again, many of the larger School Boards have incurred serious financial loss by preparing memoranda and sending deputations to London. Taking all things into consideration, I am strongly of opinion that by the loss of the Bill the hands of the educational clock in Scotland have been set back in a way which at the present time it is hardly possible to estimate correctly. It is idle to throw the blame on any one party in politics. It appears to me that both parties are responsible in the matter. Now that the chances of seeing another Education Bill introduced for several years are so small, what are we to do? It has been suggested in some not uninfluential quarters that the much-maligned method of dealing with Scottish education by Minute will have to be resorted to. I am confident that only in this way will the damage now caused be to some extent repaired. There are one or two problems confronting Scotland at the present time, and if we are to delay their solution until Parliament takes the questions up, then we are simply postponing them, I rather think, to the Greek Kalends.

IT is not often that in educational affairs we are face to face with a question of too much money and how to spend it. But at present that would seem to be the condition in which Scottish education is. But where the flesh is there are the ravens gathered together, and no doubt there will be many crying out for a share of the surplus wealth. This embarrassment has been caused by the failure of the Bill. The Department is left with a large amount of unappropriated money. A sum of about £100,000 was held in suspense from last year, and provision was made for its appropriation in the Bill. But now that the Bill is dead the money is left in the hands of the Department, as also the proceeds of the same grant for the current year, which will be considerably in excess of the balance brought forward in the Bill. It is to be hoped that this money will not be divorced from educational purposes, and that the Government may deal with its allocation by Minute. The great danger to be avoided is the frittering away of this money in paltry grants. Some—if not all—of the money might be made available for the training of teachers. This is, to the mind of many educational authorities, the most important problem at present facing us in Scotland. For until adequate provision be made for training the requisite number of certificated teachers we will be menaced for many years to come with an increase of the untrained element in our school staffs, an element which is detrimental to the best interests of education. Not a few teachers have fixed longing eyes on this money with a view to its appropriation for supplementing superannuation allowances. But this should be met from other sources, as I hope to show below.

Embarras de Richesses.

EDUCATIONAL authorities throughout the country are now making their appointments to the New Councils to be instituted in connection with the training of teachers. It is to be hoped that these appointments will not be premature and futile. Opportunity to discuss the Minute is to be given on the taking of the Scottish Estimates in Parliament, and though vague rumours of opposition are afloat in the air, it is generally expected that these will end in smoke. Such is the ardent desire of those who have this matter of training at heart. But it is impossible to tell what will happen in this Parliament of surprises. The religious element introduced in the Minute and Memorandum may be the means, as it not infrequently is, of setting the heather on fire. Lord Balfour of Burleigh has his amendments ready, I believe, and it depends largely on his attitude to the question how it will fare. "Use and wont" is to be adhered to, and that should satisfy even the militant Churchmen. But there are some who desire the religious teaching safeguarded, and with these I must confess to have some sympathy. There does not seem, however, to be much reason to fear the total abolition of religious teaching from the Training Colleges. Certain it is that the larger question of the training of teachers must not be allowed to be relegated to the background. The new Provincial Councils will, I trust, be in working order before the end of the autumn; if not, Edinburgh University has been most unfairly dealt with in the matter of King's Students. For in the winter of last year the Department would not sanction the University's scheme in view of their tackling the larger question of training in the immediate future.

The Training of Teachers.

ONE result of the Bill which is wholly bad is the way in which the question of Superannuation is now left. By the Bill it was proposed to grant School Boards the power to supplement pensions. This was felt to be a matter of justice. For in many quarters this subject is considered one of very grave concern. To this matter, in view of the septennial revision which falls to be made this year, no doubt more attention will be given by the teachers' associations. All are agreed that something will have to be done in this matter. The question of Superannuation cannot be allowed to remain in the same position. The teachers, very wisely I think, resolved to let the seven years pass before they tackled the subject seriously. This plan of campaign has been followed, and now there appear in various quarters heralds of the coming controversy. On the subject a most interesting and valuable pamphlet has been issued by the Scottish Class Teachers' Association. In addition to a very exhaustive paper on a plea for the reconsideration of the Teachers' Superannuation Act, the booklet contains a number of tables showing the pension schemes of the British Government, of private companies, of New Zealand and the Continent. By means of these comparative schemes it is clearly shown how unworthy of the profession the present Government scheme is. I should hope that in the matter of the improvement of the 1898 Act the N.U.T. and the Institute will go hand in hand. Signs are not wanting that the actuarial basis on which the scheme rested is far out. Each year sees funds rapidly accumulating. The Class Teachers' Association suggests

Superannuation.

that the State allowance be considerably increased, that the Act itself be remodelled to permit of the fund being put on a money returnable basis, and that it be optional for men to retire at sixty years of age and women at fifty-five.

IN dealing with the subject of Higher Education, Professor Darroch said that Secondary Education in Scotland had been neglected by the State. They had not a regularly organised system of secondary education in the country districts of Scotland. One great evil they had to combat was that some of their schools were trying to combine the higher grade school and the secondary school, and were failing in both. In the past Higher Education in Scotland had depended largely on the initiative and the good guidance of individuals, and on the various trusts of Scotland. In England, as the result of the Education Act, Sir William Anson affirmed that the number of secondary schools had more than trebled in the last four years. Scotland is very likely to be out-distanced in this connection by England and other countries. It will be necessary for the Department to give the new Provincial Councils powers to co-ordinate Elementary and Secondary Education. By this means much could be done to counteract the evil influence of the death of the Bill. Political vicissitudes are likely to make any great educational reform well-nigh hopeless for some years to come, and Professor Darroch calls on the Scottish Education Department to descend upon us again as a beneficent *deus ex machina*, and do for us what statesmen and political parties have failed to do. Scotland is thus dependent on those very Minutes which in the past have been so much sneered at. The State can no longer rest satisfied with making due and adequate provision for elementary education. Secondary education is, in the stress of foreign competition in commerce, as necessary for the nation's welfare and progress. The sooner this is realised the better for Scotland.

Secondary Education.

THE Annual Meeting of the Institute is bound this year to be one of the largest we have had. This, not because there are any important matters coming up for discussion, but because Edinburgh at that date, September 16, is likely to be the scene of a large gathering of Volunteers from all parts of the country. The King is to hold a review on September 18, and as a holiday will be given in nearly every part of Scotland on that date, we have every reason to believe that the September meeting on the Saturday preceding will be crowded. The retiring President's address will likely take the form of a wail for the past year's failure. The new President will likely have a quiet time of it; at all events there are no rumours of impending controversy. For the first time in the history of the Institute a lady will fill the Vice-Presidential chair. At the close of the meeting the ladies will hold their annual meeting, which year by year increases in importance and influence. The great increase in the membership of the Institute, over 1100, is sure to have a beneficial effect on the finances. It seems to me that each year shows the necessity of laying aside a large amount of money for the purpose of having a teacher Member of Parliament. The fruitless efforts made by the Institute in the lobby of the House of Commons to my mind points this moral. We shall never, as an Institute, wield the power we should until we have a spokesman of our own on the benches of St. Stephen's. Our funds are now sufficiently healthy, and some of us feel that the time is now opportune for the initiation of this new policy.

E.I.S. Doings.

AS was generally expected, the new Evening School Code contains very few changes. The terms of admission to the various divisions have of course been altered, and some simplification in the method of issuing certificates has been introduced. Discretion is now to be given to the Managers to admit pupils to Divison II. The cast-iron rules previously in vogue have been the subject of much heart-burning in various quarters. There can be little doubt that the best interests of Evening Schools will be served by the introduction of more elasticity in this department. The only new subjects introduced are—Vocal Music, Wood Carving, and Elocution.

The Evening School Code.

SUGGESTIONS FOR THE CONSIDERATION OF TEACHERS.

BY THE BOARD OF EDUCATION.

IN issuing a volume bearing the above title, the Board of Education have initiated a movement which is likely to produce most excellent results. A prefatory memorandum gives the reason for its publication and explains its purpose.

Emphasis is laid on its tentative character, and well-considered criticism is invited with a view to increasing its usefulness. Great progress in educational matters has been made of late years, and it is essential that teachers should become acquainted with modern development in the practice and theory of teaching.

All teachers would profit by access to a library well furnished in what may be described as pedagogic literature, and by the opportunity of attending lectures, demonstrations, and discussions given or conducted by teachers, versed alike in the theory and practice of education. But only a limited number of teachers can avail themselves of such methods of keeping abreast with educational progress, and it is hoped, by a continuous and systematic revision of this volume, to incorporate in it all that experience shows to be of real moment as making for the success of a Public Elementary School.

In the chapters given, we find a justification for the presence of the ordinary school subjects, an indication of the principles which should underlie the teaching of each of the subjects, and in certain cases schemes which show in outline how those principles could be applied in framing a syllabus.

The main purpose of the book is to furnish some guidance of a general character to teachers, and to encourage careful reflection on the practice of their profession. The suggestions as to method are issued in the belief that they are calculated to lead to good results. They are not intended to condemn the use of any methods which a teacher believes to be useful, more especially when his belief is confirmed by experience.

Neither the present volume nor any developments

or amendments of it are designed to impose any regulations supplementary to those contained in the Code. The only uniformity of practice that the Board of Education desire to see in the teaching in Public Elementary Schools is that each teacher shall think for himself, and work out for himself such methods of teaching as may use his powers to the best advantage, and be best suited to the particular needs and conditions of the school. Uniformity in details of practice (except in the mere routine of school management) is not desirable even if it were attainable. But freedom implies a corresponding responsibility in its use.

Teachers who use this book should therefore treat it as an aid to reviewing their aims and practice, and as a challenge to independent thought on such matters. Substantial agreement, or dissent on definite and reasoned grounds, fortified by experience, will be results equally welcome to the Board. Many teachers may disagree with some of the suggestions in the following chapters; in that event they should ask themselves whether their own procedure, however sanctioned by convention, may not after all be open to question. If then, after full consideration, the teacher finds reason to wish to alter the methods hitherto adopted in his school, he would do well to consult the Inspector before he adopts other methods suggested in this volume. No teacher can teach successfully on principles in which he does not believe, nor must he lightly use his class as a field for experiment.

The Board hope to be able to collate the results of careful observation during the next few years, so as to be able to issue some general outlines of aim and method, proved by searching tests to be practicable and effective in Public Elementary Schools; and they would strongly recommend Local Education Authorities to give opportunities in one or two selected schools for experimental work within definite limits. These experiments might be carried on in some cases by teachers of long experience, in others by younger teachers who come fresh from the influence of the excellent professors or lecturers in education who are now to be found in many of our training colleges. It is hoped that this volume will lead to greater activity in the organisation of practical inquiries as to the education best suited to schools of various types in characteristic localities. In work of this kind the authorities and the teachers may count on the active assistance of the Inspectors, who will be ready to convey to the Board any suggestions which it is thought may tend to the improvement of this book, or the reports of any important experiments in Elementary Education which may have been tried in their districts.

THE PHYSICAL EDUCATION OF INFIRM CHILDREN.

BY H. RIPPON-SEYMOUR,

Chief Instructor, George Watson's College, Edinburgh; Member International Congress on Physical Education, Paris, 1900; Author of "Physical Training," etc.

"*NON est vivere, sed valere vita.*" In a former article, "Physical Training as a Branch of School Hygiene," I touched on this subject, but only superficially, as I considered it required, and deserved, more special recognition and treatment.

It must be painfully apparent to all who are brought into daily contact with children, more especially those of the lower classes—socially speaking—that there are many who, on account of some deformity or physical defect, require a special form of educational physical exercises: children for whom the ordinary school drill, no matter how carefully thought out, how scientific, is quite unsuitable, even dangerous.

Is it too much to ask that some provision shall be made for the special instruction of these unfortunate little ones, some therapeutic treatment given them which has for its object the diminution, if not the total eradication, of their infirmities?

There are, of course, arguments for and against this proposal. Let us first consider those in its favour.

If school physical education is to be of value to all the scholars, as it is undoubtedly intended to be, then the exercises must be made to suit the pupil, and not the pupil to suit the exercise.

It is not sufficient to answer that physical training—or drill, to use the hackneyed term—is provided, and that if the child cannot take that drill it must go without. Many of the exercises are as unsuited to infirm children as would be mathematics to a class of infants.

It may be laid down as an axiom that "*none ought to be excused from gymnastic exercise, except on account of incurable deformity or organic disease which would be aggravated by exercise.*"

But it is too often assumed by the teacher—both of mental and physical education—that each child in a class should learn the same thing in the same way, and at the same rate as the other.

However well this may work in regard to mental education—which is not my province—it certainly does not answer at all with physical education.

Even between fairly healthy, strong children their physical progress differs in very marked degree; more, I venture to say, than in their mental progress. At the end of a session of school-work every child will have made *some* progress mentally, but under the present system of physical education there will be found a number of pupils who have made no physical progress whatever. That is, of course, comparatively speaking: regarding the ratio of increase in height and weight, compared with nerve and muscle power, general health, etc.

There are many reasons for this. Mal-nutrition, over-study, deformity, defective eyesight, weakness, shyness, etc., all tend to prevent natural progress physically, and yet notwithstanding these defects such a child may make very fair progress mentally.

These, then, are types of the pupils who require special treatment, for even as they are unable and unfit to take the ordinary physical exercise with their class-mates, so also are they invariably discovered to be unwilling to join in the usual playground games.

Knowing their weaknesses, they fear to be seen, to be laughed at, to be ridiculed, and who can blame them?

What is the remedy for this state of matters?

I would propose that every class-teacher should select those children who from any physical disability are prevented from taking the existing "school drills."

These children—probably amounting to from seven to ten per cent. of the total number in attendance—would be examined by a medical man, classified under

various heads or "cases," and their special type of exercise, if any, determined.

As far as possible those for whom similar exercises were suitable would be grouped, whilst those requiring more special and individual movements, as for spinal curvature, etc., would be treated each according to his special need, until the various movements were well learned, when they could very well do without more than an occasional hint from the "medico-gymnastic-specialist," who would of course be present during exercise.

Suppose, for example, a school of 1000 children. There would probably be ten per cent. requiring special treatment, divided into the following types or cases:—

(1) Flat-foot.	(2) Extreme nervousness.
(3) Chorea.	(4) Extremely undeveloped.
(5) Lordosis.	(6) Spinal curvature.
(7) Lungs (asthma, etc.).	(8) Rickets.

These cases could be grouped for similar treatment somewhat as follows:—

(*a*) Nos. 1, 2, 3, 4, and 8 could all share the same movements.
(*b*) Nos. 5 and 6, special exercises.
(*c*) No. 7, particular breathing exercises.

This would give three special groups or classes which would fall under the supervision of the expert visiting teacher.

The children would require somewhat less than half-an-hour's instruction per day, and it should be impressed upon them, and, if possible, upon their parents, the advantage to be gained by also going through these special movements once per day at home. Thus the special work of a school of 1000 children could be undertaken in but little over an hour a day, which would easily permit the expert to take four schools under his charge with a daily visit to each.

Against the adoption of such a system of practically individual treatment, only one argument of any weight can be urged, viz., expense. It of course entails the employment of a qualified medical man, and also of a *highly qualified* expert in Physical Training, for every four or five schools under a School-Board. But in many instances this latter is already the case, so that the only actual increase in expense would be created by the medical appointment.

It is, however, a certain duty on the part of educational authorities to provide for such special treatment for the weak and delicate children under their care for five or six hours daily, for it is an unfortunate fact that the very children who most particularly require physical training are those who, from one or other of the causes enumerated above, are unable to take it.

In conclusion—to quote from my former article—"Without in any way claiming that physical training is a panacea for all the ills that child-life is heir to, it is daily becoming more recognised by the medical profession as a distinctly remedial measure . . . of great value and wide applicability where neither surgery nor medicine would be of any use. . . . By these means many of the 'defectives' may, in the earliest stages, be completely cured, whilst the more advanced cases may be greatly benefited and given the opportunity of becoming useful citizens."

"*Ut prosim*," an excellent motto for the powers that be.

THE TRAINING OF PUPIL-TEACHERS.

THE New Regulations for the Instruction and Training of Pupil-teachers have recently been issued, and contain some important alterations. Some of these have been foretold in previous issues and now come into force. The Board of Education seems to be making great efforts to put an end to the instruction of pupil-teachers by the head-teachers of the day schools in which they work, or in Central Classes. Such instruction will be recognised only "where it is shown to the satisfaction of the Board that it is impossible to provide for the instruction of any pupil-teacher in a Centre satisfying the conditions laid down in Articles 11 to 19 and Article 24." The onus of proving the impossibility of making this provision rests with the Local Authority, which will be required to furnish a statement giving a general survey of the steps which have been taken to provide Pupil-teacher Centres in its area, and showing the grounds which have prevented the establishment of Pupil-teacher Centres in any parts of the area in which it is proposed to continue instruction under Article 28.

In Article 13 the curriculum for Pupil-teacher Centres is laid down in great detail:—

13. (*a*) The course of instruction for every pupil-teacher in a Centre must include English Language, Literature, and Composition, History, Geography, Elementary Mathematics (including Arithmetic), Elementary Science (including practical work), Reading and Recitation (including voice production), Drawing and Physical Exercises. Boys should, as a rule, be instructed in Manual Work, and girls in Needlework, and both boys and girls should be instructed in Music. One Language other than English should, where possible, be also taken by some or all of the pupil-teachers, and two may be so taken with the approval of the Board. Not less than half the time available for instruction should be devoted to English, Geography, History, and Languages. Where the Centre is attached to a Secondary School or a Higher Elementary School, proper provision must be made for the co-ordination of the instruction given in the two institutions.

(*b*) Every pupil-teacher in a Centre must, except with the special consent of the Board, enter for an approved Leaving Examination, which may be either the King's Scholarship Examination or the Preliminary Examination for the Certificate, or some other Examination qualifying for admission to a Training College. (See Appendix B.)

N.B.—The Regulations and Syllabus for the King's Scholarship Examinations for 1905 and 1906 are printed as Appendices D and E to these Regulations. No King's Scholarship Examination will be held after that for 1906. In place of it there will be held for 1907 an Examination which will be known as the "Preliminary Examination for the Certificate," and this Examination will be accepted, together with the other Examinations named in Appendix B, as qualifying for admission to a Training College.

The Regulations and Syllabus for this Examination are printed as Appendix F to these Regulations. No student admitted to a Training College in 1907 or afterwards will be allowed to be prepared for an Examination forming a recognised stage towards a University Degree as part of his Course, unless he has either

(*a*) passed the Preliminary Examination for the Certificate and obtained in that Examination distinction in English, History, and Geography, and also in four optional subjects, including two languages, one of which must be either Greek, Latin, French, or German; or

(*b*) passed some other Examination which may have been accepted by the Board for the purpose.

The Prefatory Memorandum goes on to state that the "Article in its new form shows how the Board think that the curriculum of a Pupil-teacher Centre should be organised in order to fill up its proper place between the course of the Secondary School and the course of the Training College, to which it will normally lead up."

This shows that the Board of Education still clings to the patchwork idea of the way to train teachers. No truly educational work can be done by sending pupil-teachers to a Centre for two years in the middle of their course. "The Board recognise that the scholars who are at present admitted into Pupil-teacher Centres have reached very varying degrees of proficiency, and that considerable difficulties will have to be overcome in organising their instruction during the early years of the new system," and we might add that those difficulties will exist until all the Secondary Schools which take probationer scholars are equally efficient, and adopt some sort of uniformity in the subjects they teach. On the one hand we hear of an Inspector telling the Head-master of a Centre that pupil-teachers should not learn Latin, and on the other of probationer scholars who have to devote nineteen hours a week to that subject. We have always advocated that the best Secondary Schools should take part in the training of pupil-teachers, but it would be a far more sensible arrangement to encourage those Secondary Schools in which the pupils commonly stay till the age of eighteen to keep the pupil-teachers right through their course, and to encourage the Centres that are well equipped to admit probationers to a two years' course before their apprenticeship begins, so that they may have a four years' course under the same influences. The hindrances in Article 20 should be abolished.

What is called the "block system" is further encouraged in Article 24, and where the pupil-teachers have been under the same teachers for a two years' probationary course it is an excellent plan, but when they have been to a Secondary School the plan is unsatisfactory, as it really reduces the pupil-teachership to a one year's course.

Another important change is announced in these regulations, viz., the abolition of the King's Scholarship Examination as such. In its place will be held in 1907 and subsequent years the "Preliminary Examination for the Certificate."

Candidates who obtain a suitable aggregate of marks in Part II. will be held to have passed the Examination, but for the purpose of this aggregate no marks will be counted for more than one optional subject, and if a candidate attempts more than one optional subject, the marks for that in which he does best will be counted towards his aggregate. All candidates who pass the Examination will be regarded as qualified by Examination for recognition as Uncertificated Teachers and may be proposed by the authorities of a Training College for admission as recognised students for a two years' course of training. It will further be possible for any candidate who passes the Examination as a whole to obtain distinction in any or each of the three compulsory subjects and of four optional subjects in Part II., and such distinction will be shown by appropriate signs in the list of results. This list will give the names of all candidates who pass the Examination in alphabetical order without classification.

The syllabus follows closely the lines of the King's Scholarship Syllabus for this year and next, which has already been reviewed in these columns. We must repeat our regret that such an important Elementary School subject as Arithmetic should be placed among the preliminary subjects in Part I., and still more that such useful and educative matters as Practice and recurring decimals should be excluded. We are at a loss also to know why the weights are excluded from the metric system. We are pleased to see that the questions will not involve long operations or complicated numbers, and that answers to money sums will not be required beyond the nearest penny. This is an approach to the teaching of approximations which we have so much desired, and we sincerely trust that in the next edition the examiners will lend their aid to securing that answers which are obviously absurd should be heavily penalised.

History is to include the main landmarks of European History, and the rights and duties of citizenship.

The Geography course is made much more workable by the restriction of the political and economic geography to Europe, including the British Isles.

The Regulations close with some rules for keeping accounts in Pupil-teacher Centres, and a very salutary rule provides that a Centre must not be conducted for private profit or farmed out to the head-teacher, and the scale of salary of the teaching staff must not be subject to variation according to the amount of grant received. As the grant is a capitation grant pure and simple, this rule is a prohibition of the application to Centres of the custom of making a head-teacher's salary depend largely on the number of scholars in the school.

THE TEACHING OF DOMESTIC SCIENCE IN THE UNITED STATES.

COLLEGES, TECHNICAL INSTITUTES, AND NORMAL INSTITUTIONS.

THIS article will deal, first with the colleges, both public and private, whose work is described in Miss Ravenhill's report, secondly with the technical institutes, and lastly with the training of teachers. The colleges, public and private, numbered altogether, in 1900, 480. Of the State colleges about thirty have courses in Domestic Science, and about thirty more give some opportunities to their students for study of the subject. Miss Ravenhill reports that the western colleges seem far more alive to the importance of the subject than the eastern. She attributes the want of activity among the eastern State colleges in large measure to the existence of excellent private institutions, such as the Pratt and Drexel Institutes, which partly supply the wants of the community.

The length of the full college course in any subject is generally four years. The course consists of prescribed and elective studies. Its successful completion entitles the student to a bachelor's degree. Students are not admitted to colleges below the age of sixteen, and are more often over eighteen. The cost of life at college varies from 300 dols. (£60) in the smaller country colleges, to 600 dols. or 700 dols. (£120 to £140) in the larger eastern colleges.

The ordinary courses in Domestic Science lead to the degree of Bachelor of Science, and take four years. Shorter courses are organised, lasting for one or two years, which are sometimes optional and sometimes obligatory for all women students. Short winter courses are also arranged in which the work is more practical and less theoretical than in the longer courses. In order to insure that general culture be not neglected, some literary studies are generally obligatory in the longer courses. In these the method of study is that of recitations (lessons) during the earlier years, followed later by lectures. "Students are encouraged to learn

the use of the college library as auxiliary to the regular exercises of the curriculum." The scope of the full courses is usually on the following lines: Sciences, obligatory — chemistry, physics, biology, physiology, sanitation; with geology, meteorology, bacteriology, and psychology as "electives." Arts, obligatory—drawing, design, architecture, cooking, sewing, dress-cutting, and fitting; with music, painting, millinery, etc., as "electives." General Culture Studies, obligatory—English literature, history, modern languages, botany, and physical culture, of which one modern language and botany would be "electives." There is generally a good deal of laboratory work, but not much practical work, as it is believed that the training given to the students should enable them to apply their knowledge without difficulty after their college life has closed.

The private educational institutions whose work is mentioned by Miss Ravenhill are the Simmons Female College, Boston, the Boston School of Housekeeping, and the University of Chicago. The Simmons Female College, founded as the result of a legacy of several million dollars by the late John Simmons, was in 1901 not yet in working order. The trustees hoped to offer courses of study which would enable women to become matrons, housekeepers, or librarians, as well as teachers of Domestic Science and Art. Four different courses were to be arranged in Household Economics, which would extend over four years or shorter periods. The fee for all courses was fixed at 100 dols. (£20) a year, while boarding accommodation could be secured for about 7 dols. (£1, 10s.) a week.

The object of the Boston School of Housekeeping, which was to be incorporated with the Simmons Female College, was "that the standard of life and living may be raised in all homes, in the belief that this would make for better citizenship, for a greater country, and for a healthier race." "It has covered the following general topics: (1) The home in relation to society; the home in relation to public health; the house—its construction, furnishing, management, and care. (2) The health of the individual." The movement has received support from many professors of colleges and universities.

The University of Chicago, which owes so much to Mr. John D. Rockfeller, was opened in 1892. "The instruction is intended to give men and women a general view of the place of the household in society, to train both sexes for the rational and scientific administration of the home as a social unit, and to prepare teachers in the subject." The work is designed to give students a grip of social and economic problems, rather than technical facility.

Special courses on hygiene are not usually given in State colleges, the Michigan and Indiana State universities being notable exceptions. But in nearly all State colleges some physical culture and gymnasium work, with lectures on personal hygiene, are insisted on. In private colleges also the resident health officers supervise the physical training and the care of the health of students. At Vassar College and Wellesley College regular instruction in personal and public hygiene is obligatory for all students in their first term. At Vassar opportunities are also given for more advanced study of hygiene, physiology, and chemistry.

The object of the Technical Institutes, of which many have been established, is to give opportunities to students, not only for technical, but also for intellectual training. The courses of study are generally planned to last six years, so that students enter straight from the grade school and receive during the earlier years a general education, and later the special training necessary for the trade or profession they select.

So great is the importance attached to a knowledge of hygiene at these institutes, that courses in bacteriology and physiology are often obligatory for all science students. At the Bradley Institute, Peoria, Illinois, sanitation or some other subject connected with hygiene is taught to all students of classics and literature in their sixth year.

The work of the Pratt and Drexel Institutes in the teaching of Domestic Science and Art can alone be mentioned here. They have an unusually high reputation, but their work may be regarded as typical of that of institutes in general. Pratt Institute, Brooklyn, N.Y., was founded in 1887 by Charles Pratt, with the object of giving technical instruction and general cultivation. Diplomas are awarded for some courses, and certificates for others. Students on entering must be over eighteen years of age, and must give proof of a good High School education or its equivalent. The building is not very convenient, owing to the fact that it was so built that it could be used as a factory if the institute failed, but the rooms are well equipped with apparatus and specimens.

The courses in Domestic Art deal with sewing, dressmaking, millinery, costume design, basketry, weaving, and physical training. The instruction is so arranged as to prepare students for professional work, teaching, and home life. The courses vary in length. For instance, the full day course in millinery lasts for four months, meets on five days a week from 9 to 12.30 and from 1.30 to 4; while the full day course in dressmaking takes two years. Details of these and other courses are given by Miss Ravenhill. Care is evidently taken to give some general as well as special training. In the millinery course lectures are given on design, hygiene, and artistic and historic dress; and instruction is given in bookkeeping. The dressmaking course includes costume design, history of costume, the keeping of accounts, and physical training. The fees for the dressmaking course are 25 dols. (£5), for the millinery course 10 dols. (£2) a term.

The Domestic Science Department also has Moral, Technical, and General courses, and Special courses for children. In the General course the following subjects are studied on five days a week for one year: chemistry, bacteriology, physiology and hygiene, sanitation, household economics; cookery, dietetics, marketing, and accounts; serving, sewing, laundry work, and house construction. The fee is 30 dols. (£6) a term. There are also special courses, day and evening courses, for mothers, domestic servants, and others. The students visit hospitals, factories, public kitchens, and other institutions.

The Drexel Institute at Philadelphia was founded in 1891 by Anthony T. Drexel to give training in art, science, and industry. The building itself is handsome, but not well planned. As at the Pratt Institute, some literary studies and physical training are required of the students, English literature, composition, and elementary psychology being compulsory subjects.

In the Domestic Art department the instruction follows the same lines as at the Pratt Institute, but more time is given to business training and to the

chemistry of dyeing and cleaning. The fees are 18 dols. and 20 dols. a term.

Various courses in Domestic Science are offered in general and invalid cookery, in food economics, and other subjects. There is also a two years' junior course for younger students. A useful course offered by both the Pratt and Drexel Institutes is the housekeepers' course, for women who have already had some experience.

The normal courses at these Institutes will be referred to later.

Teachers of Domestic Science and Art generally receive their training in post-graduate courses at private Technical Institutes. An increasing number of State Universities also offer normal courses. Special training is always demanded of teachers of Domestic Science and Art, and the two subjects are generally studied separately. As, however, one teacher is frequently called upon to teach both subjects, students often specialise in one, and acquire some general knowledge of the other.

As there is no central Examining Board in most States and no general standard, the value of the diploma usually given on the completion of a course of training varies with the institution that gives it. Institutions that have a high reputation, such as the Pratt and Drexel Institutes and Teachers' College, Columbia University, occupy a commanding position. The supply of vacancies is so inadequate to the demand that careful selection of candidates is possible. In this way a high standard of personal character and physical fitness for the work is maintained. Much greater importance is attached to the result of personal observation of students than to their work in examinations.

Though there has been a tendency in the past to disparage a normal training in Domestic Science and Art on the part of teachers of the humanities, this is gradually dying out as the value of the subject is asserting itself, as its teachers are realising its importance in relation to home life, and as the sympathy of male professors of other subjects is being enlisted.

The courses vary greatly in length and in the nature of the work done by the students. At the Pratt Institute the two years' course in either Domestic Science or Art may be supplemented by a third year of elective work. In the case of immature students three years' work is insisted upon. Students of either course are prepared to teach both Domestic Science and Art, but more time is devoted during training to that branch in which they wish to specialise. Students also study psychology and the history of education, but in this branch of the subject Miss Ravenhill reports that students are ill prepared.

The work of the Drexel Institute is very similar. Rather more emphasis is laid on a knowledge of business methods and of human physiology. The length of the course is two years.

At the Framingham State Normal School (Mass.) the ordinary course lasts two years, but students who have taken the regular Normal course may take the Household Arts course in one year. The object of the training is rather to inculcate good habits of thought and work than wide knowledge. A good deal more time is given to practice teaching than is the case in the Pratt Institute.

The Cread Institute (Mass.) makes an unsuccessful attempt to do in a one year's course the work usually done in two years, with the result that the health of the students suffers. A less ambitious short normal course is the six months' course at the Boston Cooking School, where instruction is given in cookery and laundry work, in physiology, hygiene, chemistry, bacteriology, psychology, and pedagogy.

Notable among the other normal courses mentioned in the Report is that of Teachers' College, Columbia University, New York.

Finally, Miss Ravenhill says: "It will be noted that the general scope of the courses is somewhat broader in the United States than in this country; that considerable time is devoted to the careful study of the theory which underlies all practice; and that importance is attached to a practical study of the scientific and artistic principles basal to that technical skill, to the attainment of which the training is directed."

MR. SWINBURNE'S NOVEL.[1]

TO few men is it given to possess *two* talents; to master *two* handicrafts; to be supreme in *two* departments of Science, Art, or Literature.

Leonardo da Vinci, it is true, was a sublime painter, a sculptor, an architect, a musician, and a poet. Rafael was poet and painter; Michelangelo, sculptor, poet, and painter; Dante, statesman, philosopher, and poet. But the great Italians of the Renaissance were Olympian in their intellectual strength and many-sidedness. *Autre temps, autre mœurs.* It is not so in the modern world, save, perhaps, in the realm of politics, where we see a paragon Secretary for War, also a paragon Secretary for India!

. . . . . .

Wordsworth and Browning, though great poets, were bad dramatists. Shelley was an indifferent pamphleteer. Scott, when he found his true *métier* as a romance writer, wisely abandoned his verse. George Eliot would have ranked among the minor poets only. Byron, we fear, would have made a poor novelist, and Mr. Swinburne has proved to be so, for his recently published novel, "Love's Cross-Currents," only testifies to the truth of our opening aphorism. The author of "Atalanta in Calydon" and "Bothwell" will have to be content with the fame of "the proud, full sail of his great verse." To some of his admirers, indeed, it may be a matter of regret that he should, at this late hour, have sought their suffrages also as a writer of prose fiction.

. . . . . .

The report that Mr. Swinburne was shortly to publish a novel fluttered the dovecotes of literary circles, and raised high hopes among his general readers, who expected to find in his new venture the tempestuous and grand style, the brilliant imagery and coloured diction of his verse. "Love's Cross-Currents" has duly appeared, but far from being the ripened fruit of his intellectual maturity, it proves to be a revival of a novel published serially many years ago in a long since dead

1 "Love's Cross-Currents." Algernon Charles Swinburne. Chatto & Windus.

periodical. The book, however, has been revised and re-named, and Mr. Swinburne, therefore, gives it an *imprimatur* of approval. We owe its re-appearance, apparently, to Mr. Watts-Dunton, and its publication may, to those who halt between two opinions, serve either of the purposes of instruction or warning. Those who incline to the former may say that no stage in the mental development of a man of letters is unworthy of study; those who incline to the other, that the aids to building, the scaffoldings and foundations, though valuable, are generally taken down, or buried out of sight when the edifice is completed.

. . . . . .

In the dedication to Mr. Watts-Dunton, which is in the genuine, later manner, with its splendid sweep, rush, and sonorous flow of word and phrase, Mr. Swinburne records his fear—a justifiable one—that the novel in letter-writing form, which even "the giant genius of Balzac could not restore to favour," nor Scott carry through successfully in "Redgauntlet," will prove as unworkable in his hands. Still Mr. Swinburne thinks that "in the world of literary creation there is a legitimate place for that apparent compromise between a story and a play" (*e.g.* the novel in epistolary form). For our part, we think this reasoning is fallacious. We fail to see that there is any place in Art or Literature for compromises of any sort, however beneficial an institution Compromise may be in social or political spheres. No author can be so Protean in style and idea as to represent *adequately* the various characters who go to make up a story, severally relating "what befalls them by word of mouth or pen." The antagonist and protagonist, lover and loved one, hero and villain, are all too apt to write or talk in the same fashion, in a recognisable vein; to ring the changes on the same ideas. It is like playing a game of cards with yourself. There is no life or action in it. The story-teller, as narrator of a narrative, speaks for others in his own voice, and tells the course of events as seen by himself, and the apparent incongruities are acknowledged and overlooked by the reader. In the letter-writing novel, this *manifold* telling is apt to jar, for you are always conscious that your puppet, though wearing the skin and bearing the name of Esau, is speaking with the voice of Jacob!

. . . . . .

In a long prologue we are introduced to the characters whose easy writing makes the story—if story there be—such hard reading. Lady Midhurst, the dowager of this strange *un*-eventful history, is a match-making grandmother, a keen, satirical, somewhat venomous dame. Her letters, the levers which move the sluices of "Love's Cross-Currents," are clever and full of *esprit*. Her morality is first cousin to that of Mephistopheles in "Faust." A typical woman of fashion, her worldly wisdom sticks at no obstacles. She gives advice profusely, sneers, sketches character, satirises her enemies and friends in a series of letters, which, wisely mixed, in some *other* novel, would evoke instant approval from the *clientèle* of the circulating libraries. "She was generally popular, except, indeed, with religious and philanthropic persons." "Balzac," she writes to her grandchild, Lady Cheyne, then in the dilemma of her incipient and stupid intrigue, "is a good model, if you can live up to him."

. . . . . .

Then there is Lady Cheyne, the grandchild in question—married to Lord Cheyne, a Social Democrat, and chairman of all sorts and conditions of impossible societies, a mere peg in the correspondence; Frank Cheyne, Lady Midhurst's nephew, a dull, stupid, vapouring fellow; "Redgie" Harewood, her grandson, a well-licked cub, who develops into a half-fast, half-slow young man; Mrs. Radsworth, her niece, married to Radsworth, a dilettante scientist, dim and nebulous. These five make up the *dramatis personæ*. Frank Cheyne loves Lady Cheyne; "Redgie" loves Mrs. Radsworth. Lady Midhurst knows all about it from all parties; chides, reproves, instructs, sneers, attempts to drive—and keep—the four in hand. These philanderings—"platonic sloughs of love," to quote the dowager's expression—give Mr. Swinburne the *raison d'être* for a year's letters, all smart, well-written, full of pretty French turns and phrases, bits of Victor Hugo, some verses, a story or two, some attempts at analysis, little touches here and there of that sensuous colour and picture which is the author's great charm in his verse. But the "something that infects the world" of Art is absent; the little is lacking which means so much in the complete and rounded story. The thing to be seen is not seen steadily, and seen whole. As a narrative, as a novel, even as an epistolary novel, it is without form and void.

. . . . . .

But our readers may querulously say, "Leave the letters and come to the story!" And we, in needy knife-grinder fashion, can but reply, "Story? why, bless you! there's none to tell!"

Lord Cheyne is drowned while yachting, but this forms no dramatic episode; indeed, is one of the tamest parts of the book. Lady Cheyne, does not, as a widow, marry Frank. "Redgie" does not succeed in inducing Mrs. Radsworth to fly with him. The "story" ends, indeed, as if the author were tired of it. "Love's Cross-Currents" run into and lose themselves in a sandy desert, and the adventurous pilgrims tracing these tangled courses find themselves in a lone and dreary Sahara of undefined impressions, vague and dim horizons. The rest is silence!

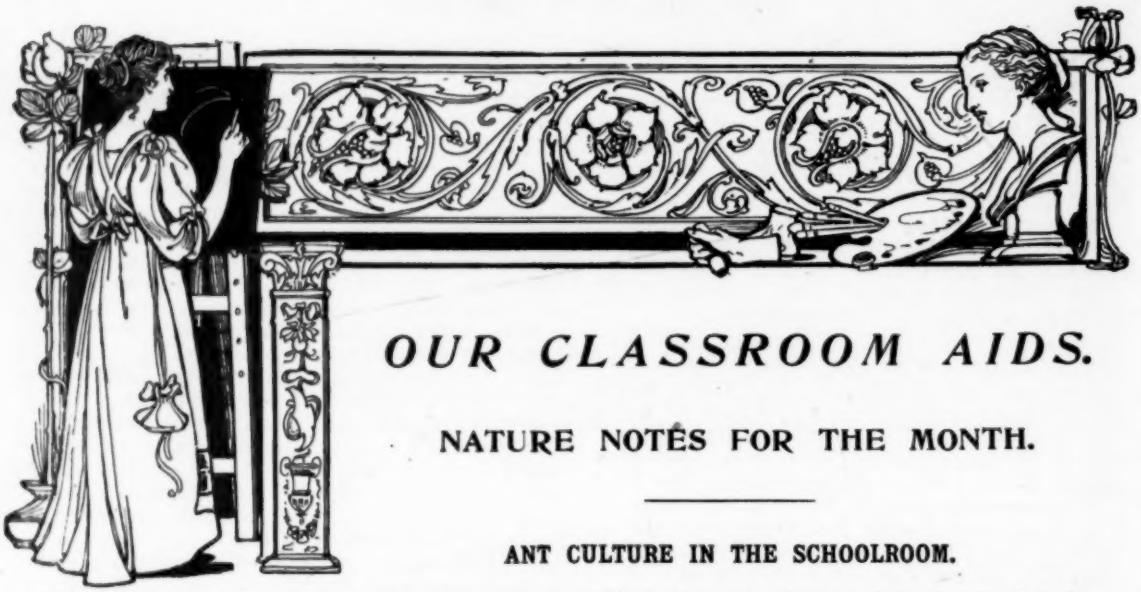
. . . . . .

Yet we would not have missed looking through this window of Mr. Swinburne's House of Life. We are inclined to be of that opinion, formerly expressed, that no epoch of a man of letters' intellectual development is devoid of interest. From Mr. Swinburne at the summit of his fame something great was to be anticipated, and he must be judged by what he has done already in building up his lofty rhyme. Judged by that standard, "Love's Cross-Currents" leaves much to be desired.

. . . . . .

Jean Paul has wisely said in his *Siebenkäs* that "there is a certain lyric intoxication of heart, during which one should not write letters, because fifty years afterwards, some one may read them who has neither the *intoxication* nor the *heart*." The letters making up this "bantling" of Mr. Swinburne's "literary youth" may well have been written in a sort of lyric intoxication, and we who now read them may have neither the intoxication nor the heart. Nevertheless one cannot fail to see that this morn of his genius gave promise of the glorious day it has grown to, and those who would judge of his whole literary career cannot well neglect his early novel.

T. M. C.

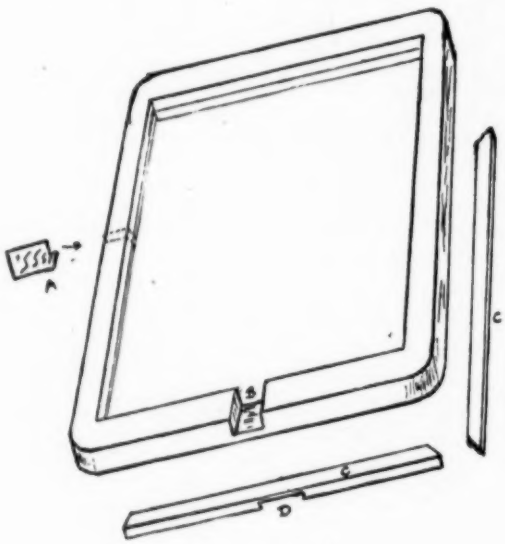


OUR CLASSROOM AIDS.

NATURE NOTES FOR THE MONTH.

ANT CULTURE IN THE SCHOOLROOM.

WITH the swarming of the bees in June we are all familiar, and, in these days of observatory hives, the circumstances which lead up to this interesting event are thoroughly understood by the majority of people. Towards the end of August, and in the beginning of September, there is another similar outburst of insect life, quite as interesting but perhaps not so widely understood. I refer to the swarming of the field ants. Go into the meadows on a sunny afternoon (September 3rd was noted in 1903), and in all probability the air will be full of tiny black "flies," apparently dancing to and fro for the benefit of numerous insectivorous birds. The unlucky creatures are ants, male and female, lately emerged from the lowly hillocks beneath; they are indulging in their honeymoon flight. Those of the fertilised females which survive the ordeal, will deliberately denude themselves of their gauzy appendages and settle down to a humdrum existence as queens or founders of fresh colonies.



THE READY FRAME.

(A) Section showing ledge upon which rests the floor.
(B) Niche opposite doorway.
(CC) Strips trimmed ready for insertion.
(D) Doorway.

Owing to their subterranean habits, ants are somewhat difficult to observe in their native surroundings. However, thanks to a well-known scientist, the practical naturalist who wishes to gain an insight into the domestic events which culminate iu the autumn ant-flight, without resorting to the text-book, has the path smoothed by the introduction of the Formicarium, the prototype of the glass-fronted observatory hive so useful to the beekeeper.

These adjuncts to nature study are becoming increasingly popular, so much so that two prominent firms of athletic outfitters now stock formicariums side by side with gymnastic apparatus, and doubtless the unwonted spectacle of flying ants will enliven many a London schoolroom this autumn.

Spring is the best time to gather the stock, but with the ant swarms flying in the sun there is a favourable opportunity to gain fresh converts, and also to give a few hints to those readers who have already set up establishments. Hence these notes.

Fitting up the Establishment.

The greater part of the material can be purchased at any photographic supply stores.

First of all we need a large printing-frame with hinged lid; 12″ × 10″ interior measurement is a good size.

The plainer the frame the better; those with the top surfaces in the same plane, similar to that of the ordinary school slate, are preferable for our special purpose.

The next item is a shallow dish. Ants usually take kindly to captivity; but, if they are not isolated, they will probably be found roving all over the house. An enamelled developing dish makes a good moat; for slender purses a tinned iron baking dish, painted with three coats of bath enamel *applied according to the*

directions on the tin, is by no means bad. The great point is to have the dish larger than the printing frame by at least an inch each way.

Two sheets of glass, each 12″ by 10″, are now procured. In reality they are just a trifle smaller than the measurements given. As they are subsequently to be fitted into the frame, and rest in position on the tiny ledge which runs round the interior mid-way down, it is advisable perhaps to take the frame to the glazier when ordering the glass.

A strip of ordinary deal, 6 feet long and $\frac{3}{4}$″ by $\frac{1}{2}$″ wide, or thereabouts, paste, baize or felt, pins, and brown paper constitute the remainder of the material.

Strip the frame bare, removing lid, and clips which hold the latter in position. Take a sheet of glass, drop it gently into position in the frame so that it rests snugly on the ledge.

Mark the height of the glass with a pencil line on one of the shorter sides of the frame and remove the glass; find the centre of the side in question, and with a fine cabinet-saw make two clean cuts from the top surface down to the pencil line, 1″ apart, and nicely balanced on each side of the centre mark, so that when we "nick out" the wooden slab between the cuts the resulting cavity comes in the middle.

ANTS' NEST IN SECTION.

Showing sequence of—
Glass.
Baize.
Wood.
Glass.

Replace the glass. If the cutting has been accurately accomplished, the bottom of the gap will be on a level with the surface of the glass, which is the floor of the formicarium.

Four thin strips of wood $\frac{1}{4}$″ by $\frac{1}{4}$″ are now required; two 10″ and two 12″ in length. These placed flat, round the inside of the frame on the edge of the glass, hold the latter firmly in position, and at the same time provide a convenient ledge or wall upon which subsequently rests the top sheet or transparent ceiling.

The strips have first to be fitted accurately before they can be finally fixed in position. This is best accomplished by "shooting" the ends at an angle of 45° (see diagram). For the present, neglect the side with the gap and fix the other three strips in position, flat on the glass, by means of pin points (pins with the head half nipped off) driven in parallel with the glass by means of tweezers. Now place the remaining strip, mark the points opposite to the ends of the gap in the frame, remove and cut a corresponding aperture on the *underside* of the strip. When finally placed and fixed, with the cut edge *downward*, there should be a tiny bridge just sufficiently high to allow the passage of the ants.

Ants greatly dislike draughty quarters. Readers may possibly remember the amusing account of the ants which blocked the extra ventilation holes with earth. Cut four strips of baize or felt, of similar dimensions to the wooden slips, and fix into position on the foregoing with thick paste or seccotine. When the top sheet is dropped into place on the baize, the body of the apparatus is finished.

It only remains to construct a skeleton table or light stool.

No special skill is required in this direction. The top of the stool should be at least 13 inches by 11 inches, in order that the weight of the apparatus may not rest on the glass floor. Two inches will suffice for the length of the four legs.

Pour water into the dish to the depth of an inch, stand the table inside the moat, and place the formicarium on top, as central as possible.

The wooden cover, reinforced on the underside by a sheet of pasted baize, is useful for the purpose of excluding the light from the interior when the inhabitants are not under observation.

The apparatus is now completely finished.

Between the two sheets of glass is a narrow space about $\frac{3}{16}$ of an inch in height. Here dwell the ants. The proximity of the ceiling to the floor precludes any possibility of their throwing up earthworks, and so hiding their domestic affairs. To compensate the lack of privacy, they should be kept dark as much as possible.

In fine weather they are able to take an airing on the outside by passing under the low doorway, but they are restricted within bounds by the surrounding moat.

Stocking.

Stocking the establishment is the most tedious part of the whole business. The nest is dug up bodily—earth, grass, ants, and young—and placed in a safe receptacle. An old bucket, with a sheet of paper tied over, answers well. If by any chance the queen—a much larger and darker insect—is seen, place her in a small box carefully *together with a few workers*.

On arriving home we have the apparently hopeless task of separating the ants and their young from the mould; but here we may take a "wrinkle" from the individuals who supply the bird fanciers with the so-called ant "eggs." Cover a large table with sheets of newspaper or an old table-cloth, and empty half of the mixture here and there in small heaps about a foot apart, using the larger lumps as far as possible. The remainder in the bucket, or a portion thereof, scatter *thinly* between the hillocks.

Ants have a great aversion to exposing their young to the light.

As soon as they have recovered from the shock of their unceremonious ejection, the workers hasten to carry the young from the glare of the surrounding plains into the friendly shelter of the convenient heaps, each of which soon becomes a miniature town, sending out rescue parties in all directions. Leave them for an hour, and in the meanwhile pick out any suspicious-looking clods and break, brushing off the ants and young into the ready formicarium. It is advisable to keep a sharp look-out for the queen, if this individual has not already been secured.

After the workers have concentrated their treasures, which can be easily ascertained by examining the intervening stretches, brush the barren mould completely from the scene of operations with a camel-hair mop, and replace with the remainder which is in the bucket. If there be no remainder, utilise a few of the heaps instead, taking care to scatter thinly as before, so

that there is no possible shelter save in the remaining heaps.

By gradually continuing this process at intervals, we ultimately get one or two heaps teeming with ant life in various stages.

Shoot the mixture into the formicarium, spread, sprinkle lightly with water, pick out stones or large lumps, replace the top glass, and finally darken with the cover.

On the following day, when the ants have settled down in their new quarters, and methodically sorted out the young into groups, the final hand-picking of the lumps may be done, and a supply of sifted earth added where necessary.

Of course we must not forget to re-instal the queen.

Hints on Management.

The erstwhile rovers are now captives, dependent on the charity of others. They are hardy little creatures; but, if they are expected to produce the best results, they must receive a certain amount of attention.

In the matter of food they are not at all particular. The yellow ants will thrive and successfully rear their winged males and females on a diet of shop honey alone. A sprig of blossom placed on the exterior will be certain to attract out the workers, so also will an aphis-covered shoot from the garden. Sugar in the form of bee-syrup is highly relished, and a piece of ripe fruit now and again should be given.

As regards animal matter they will appreciate flesh of all kinds.

Try the large black wood-ant, *Formica rufa*, the most interesting and exasperating of all the family, with a succulent cockroach.

When engaged in angling, I have on several occasions seen the yellow ants march triumphantly away with particles of the bread and bran ground-bait.

In cold weather the ants will be very reluctant to leave the interior; the food should then be placed inside. But in the ordinary course, feed outside as much as possible in order to avoid the presence of decaying litter in the nest.

Never neglect to replace the cover.

The removal of the dead need not trouble the amateur; the ants will dispose of their dead comrades by unceremoniously pushing them to the furthermost edges, or even out into the moat.

Now and again, when the soil becomes dry, they require to be sprinkled gently, and in the winter a few pieces of baize or brown paper placed on the stool beneath, will serve to maintain an even temperature.

At Stepney, during the past three years, we have experimentally kept three species of ants: the black, common to London gardens, the yellow, and the red or large wood-ant. The latter—the nest of which would cover an ordinary kitchen-table—effectually turned the tables on their captors by overrunning the whole building.

Readers who have had experience with this vicious little inhabitant of the pine woods will probably, and wisely so, prefer to keep the docile black or yellow ants.

For further particulars as to life, history, and habits, I must respectfully refer to the previous September number.

NOTES OF LESSONS ON APHIDES.

Class.—These lessons are suitable for the upper standards of all schools; for even in the most crowded neighbourhoods, where the children have few opportunities of studying Nature, a few plants will be found which the children can watch, and possibly tend with their own hands, in which case they will have made the acquaintance of these foes of the gardener, and will take a keen interest in their life history.

Time.—Two lessons of about thirty minutes each.

Object.—To show the children that there is nothing in Nature so small or insignificant that it cannot afford some interest to the observer; as a matter of fact the child will find, as its field of observation widens, that as a rule the lower forms of life afford as many or even more points of interest as those more highly developed, and that "Nature is greatest in that which is least."

Step I. Preparation.—A few twigs from a rose-bush or a bean-plant, covered with what is commonly known as "blight," should be shown in order that the children may see how these tiny insects swarm on the leaves. If possible one should be shown under the microscope.

Step II. Presentation.—1. *What is "blight"?* Every one has seen plants suffering from "blight," and those who have the care of plants know that these injuries are caused by tiny insects which they endeavour to destroy by means of tobacco, aloes, or quassia.

2. *Aphides are true insects.*—If we examine one of these tiny creatures, which are known as aphides, under the low power of the microscope, we shall at once note that it has six legs and two antennæ which, together with its shape, leads us to conclude from its appearance that it is a true insect. The antennæ are very flexible, and, when not in use, are folded behind so that they lie along the back of the insect. The mouth is furnished with a proboscis, inside of which are three sharp points; these points are used to cut the surface of the leaves in order to cause a flow of sap which the insect sucks up by means of its trunk. The length of this organ varies with different kinds of aphides; those that live on leaves have very short trunks, for in a leaf the sap is found quite close to the surface, but those that live on the stems have a proboscis of sufficient strength and length to pierce through the bark and reach the sap beneath; when not in use these long trunks are coiled up like a spring, but they are easily pulled out in order that their length may be seen. About two-thirds of the way down the back will be found the nectaries or cornicles. These organs, which are characteristic of the aphis, look like two tiny bristles, but in reality they are hollow tubes through which the insect gives off the sweet liquid known as "honey-dew." This liquid is thick and sticky; so, when it falls on the leaves, it chokes up the stomata or pores and prevents respiration, thus adding to the injuries the insect has already inflicted on the plant by robbing it of its sap. In colour the aphides vary considerably, those found on the bean are black, those on the rose green, while those on the apple are red or yellow.

3. *How aphides multiply.*—One of the first things to strike an observer about these interesting creatures is the vast numbers in which they exist in spite of all our efforts to keep them under. This is not surprising when we discover the marvellous rapidity with which they multiply. We have already seen that insects

have to pass through three distinct stages in their brief lives, but in the case of the aphides this rule will require certain modifications. At the fall of the year the female lays her eggs, fastening them securely to a twig by means of a gummy substance, thus giving the twig the appearance of having been dusted with coarse black pepper, and here the eggs remain until the genial warmth of spring hatches them, and the first brood makes its appearance. These pass through the three stages, casting their skins in the larval state just as the gnat or any other insect does; but, having arrived at the mature state, they give rise to a second brood which do not pass through the preliminary stages, but are born resembling the parents, except that they are all females, and, almost without exception, wingless. After a few days these produce a third brood, which in turn produce a fourth, and so on, ten or eleven broods being produced during the summer, all, with the exception of the last, being females and wingless. The last brood, however, consists of males and females, both havings wings and in every way similar to the original brood, whose work they complete by depositing eggs to carry on the race. It has been calculated that a single female produces fifty or sixty young ones; so, if we reckon ten generations during the summer, a little arithmetic will show the astonishing manner in which these creatures multiply. Professor Huxley has calculated that the descendants of a single aphis would, if unchecked in any way, equal in weight one third of the entire population of the world.

4. *Foes of the aphides.*—Fortunately for us, the aphides have many foes, otherwise the world would soon be perfectly uninhabitable; these allies of the gardener are far more effective in stopping the ravages of the aphides than any amount of tobacco or quassia, and yet they are often destroyed by those who are unable to distinguish between friends and foes. First and foremost comes the well-known "lady-bird." The larva of the lady-bird is particularly partial to aphides, and will clear a leaf in a very short space of time; accordingly the lady-bird usually selects a blighted leaf or twig on which to deposit her eggs, in order that there may be a good supply of food ready for the larvæ when they are hatched. Another foe to the aphis is the ichneumon fly, a parasite well known to all collectors of insects. The female ichneumon deposits her eggs in the body of some other insect, so that when the grub is hatched it feeds upon its unfortunate host. So small are these eggs that half-a-dozen are often deposited in a single tiny aphis, with of course fatal results, and scores of empty skins hanging on a twig will testify to the ravages of this parasite.

The larva of the pretty little lacewing fly also devours aphides with astonishing rapidity; seizing the aphis by the neck, it eats the softer portions, rejecting the legs and harder parts, and either by design or accident the grub soon gets covered with these rejected portions, which cling to its hairy body, thus giving it the appearance of a piece of lichen or dry moss. This does not by any means complete the list of creatures that carry on a deadly war against the aphides, but enough has been said to show how nature preserves a certain even balance among her creatures, preventing any race becoming too numerous.

Step III. Association.—The study of the aphis cannot be dismissed without a few words on its interesting association with the life and habits of the brown ant. It had long been known that there was an intimate association between aphides and ants, but the exact nature of this association was not quite clear until Linnæus announced, as the result of his investigations, that aphides are the cows of the ants. Subsequent observations have proved the truth of this statement; for, just as we keep cows to supply us with milk, so the ants use aphides to supply them with "honey-dew." Watch a brown ant through a magnifying-glass as it moves about among a group of aphides; it will be seen to creep up to one of them and gently stroke it on the back with its antennæ until two tiny drops of honey-dew appear at the ends of the cornicles; these are eagerly devoured by the ant, who then passes on to another aphis. In return the ants do what they can to protect their "cows" from the attacks of their enemies, and two or three ants may often be seen guarding a colony of aphides and driving off flies and lady-birds. Lord Avebury, who has made a long and careful study of the ant, states that these intelligent little creatures will gather up the aphides' eggs in the autumn and carefully store them away until the following spring; then, when the eggs are hatched, the young ones are carried out and placed on a daisy or a dandelion, around which the ants will build a wall of earth to protect their "farm."

Step IV. Formulation.—1. "Blight" is usually the effect of a vast number of tiny insects called aphides.

2. The aphis is a true insect, but exhibits important modifications of the law of insect development; there are ten or eleven broods during the summer, and all except the first and last consist of wingless females.

3. If unchecked, the aphides would soon overrun the whole world, but they are kept in check by the lady-bird, ichneumon fly, lacewing fly, and others.

4. Ants feed on the honey-dew of the aphis, and will tend and guard the aphides in order to obtain a supply of food.

Step V. Application.—To those that have the care of plants these lessons will prove useful in enabling them to distinguish between friends and foes. So small are the aphides that at first one can hardly realise the immense amount of damage they are able to do, and hence the value of every lady-bird, &c., to the community. In 1825 the hop gardens of Kent and Surrey were attacked with "blight," and the whole of the crops, to the value of over £3,000,000, utterly ruined; this of course was a terrible loss to the hop-growers and indirectly to the country, but we must remember that it is entirely due to our insect allies that similar disasters do not occur more frequently.

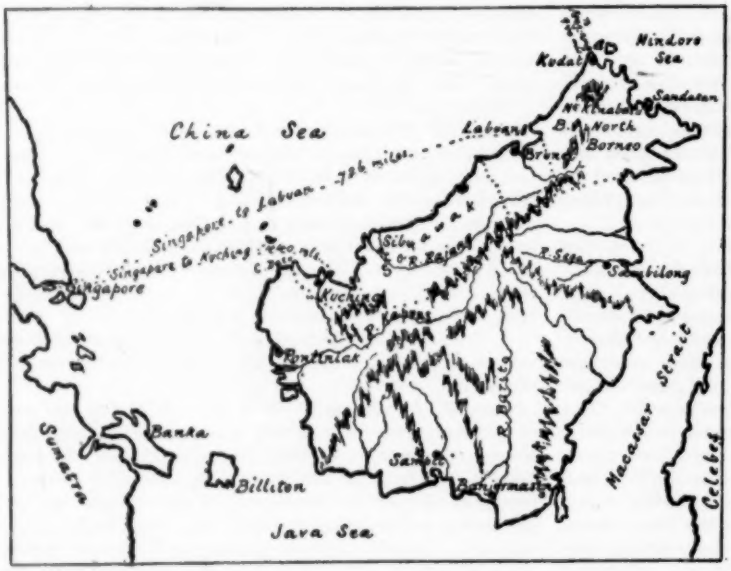
And yet, on the other hand, it is impossible to contemplate these teeming multitudes without being impressed by the greatness of little things, and when one thinks of a single spray of rose leaves with as many inhabitants as a good-sized town, each one most exquisitely formed and fitted for its particular mode of life, what a depth of meaning is seen in the well-known words of the Psalmist: "These wait all upon Thee, and Thou givest them their meat in due season."

Mr. J. C. Pryor, agent for the Yōst Typewriter Co., Ltd., at Plymouth, has secured first place in the kingdom for the Society of Arts Typewriting Examination (Advanced Stage), and won a silver medal and the Society's prize of £3 in cash. Great credit is due to Mr. Pryor and the Yōst machine for this achievement.

OUR ILLUSTRATED GEOGRAPHICAL NOTE-BOOK.

BORNEO.

BORNEO, in the Malay Archipelago, with an area of 290,000 square miles and a population of about 2,000,000, is the third largest island in the world. It is traversed by mountain ranges in almost every direction. In the extreme north is the gigantic mass of *Kinabalu* (13,690 feet), the highest point of the Archipelago. From this there runs a ridge to the south-west, from which radiate other more or less parallel ridges, mainly to the south-east. The rivers are numerous, and many of them allow the passage of vessels of considerable burden, but their mouths are



generally impeded by sandbanks which interfere with their utility for sea-going vessels. The greater portion of the island lies within five degrees of the Equator, and in the valleys the climate is hot and humid and unhealthy for Europeans. In the elevated regions of the north, the temperature is considerably modified, ranging from 80° to 90° at noon, and causing white men little or no inconvenience. The vegetation of the island is marked by a bewildering luxuriance. In the forests are ironwood, teak, ebony, sandalwood, gutta-percha, camphor, sago, and dye-woods. A number of trees yield gums, resins, and vegetable oils, etc., among which are cutch and benzoin.

Catechu or *cutch* is a brown astringent substance prepared from the tannin and colouring matter extracted from a species of acacia. Its tanning properties are of such excellence that it will tan skins in five days. Cutch is also used extensively in calico printing in England.

Benzoin is a gum or resin of great utility in perfumery. It has an agreeable smell, especially when burnt, and is in great request for incense and fumigating preparations. As an article of commerce in the East, benzoin exceeds even camphor in value.

Cinnamon, pepper, cloves, nutmegs, rice, sago, ginger, millet, cotton, sugar, tobacco, indigo, coffee, and cocoa-nuts, are successfully cultivated.

The minerals are varied and abundant. Coal, gold, and antimony are at present the most valuable, but iron, copper, tin, nickel, petroleum, and sulphur await exploitation.

The bulk of the inhabitants are Dyaks; the remainder are chiefly Malays and Chinese. The Dyaks rank higher than the Malays in intelligence and morals; they are temperate in food and drink, and, though dilatory, truthfulness is a marked feature of the national character. They appear to be decreasing in numbers, probably owing to the most laborious work falling upon the women. "A Dyak woman," says Mr. Wallace, "generally spends the whole day in the field, and carries home every night a heavy load of vegetables and firewood, often for several miles over rough and hilly paths, and not unfrequently has to climb up a rocky mountain, by ladders and over slippery stepping-stones, to an elevation of a thousand feet. Besides this, she has an hour's work every evening to pound the rice with a heavy wooden stamper, which violently strains every part of the body. She begins this kind of labour when nine or ten years old, and it never ceases but with the extreme decrepitude of age." Men and women wear numerous ornaments—earrings, necklets, bracelets, and anklets of various kinds; and frequently the body is tattooed. The ear-lobes in particular are loaded with tin or brass rings, weighing as much as three or four pounds, which elongate the lobes to six or seven inches. The principal war weapon of the men is the *mandan*. The blade is nearly two feet in length, concave on one side, convex on the other, with only one edge sharpened. An elaborate wooden shield is trimmed with human hair. A sumpitan or wooden blowpipe is used for shooting poisoned arrows.

Head-hunting is a special feature in the life of the uncivilised Dyak, and no man is allowed to marry who has not possessed himself of the skull of an enemy. The collection of heads is particularly necessary to suitably mark certain occasions, as the death of a ruler, etc. Some of the villages possess a common head-house, where hundreds of heads are threaded and suspended on lines. The skulls, with their grinning teeth, nodding in the breeze, is a sight that is calculated to give a white man a shock when first he enters the gruesome building.

The Partition of Borneo.—Four hundred years ago the island was of considerable importance, and the Chinese had established a lucrative trade with the natives. Lorenzo de Gomez, a Portuguese, was the first European to call at Borneo on his way to China in 1518. Eighty years later the Dutch arrived to trade for diamonds, precious metals, and pepper. In 1785 they acquired some territory around Banjermasin, and now claim the greater part of the island. Little is

known of a great deal of the interior, and Dutch government is purely nominal except in the coast districts of the south and west.

It was not until early in the eighteenth century that the British East India Company established warehouses at various points along the north-western coast. The effort was not crowned with success, and before the end of the century the pirates who invested Malaysian waters had wiped the trading stations out of existence.

At the present time Great Britain has under her protection a strip of territory extending from Cape Datu to the Mindoro Sea, consisting of the independent state of Sarawak, the sultanate of Brunei, and British North Borneo.

Sarawak.—The history of the building of the British Empire is a story of interesting incident, but the manner in which Sarawak came under British domination is nothing short of romantic. James Brooke, who had been in the service of the Company, in a yacht of 142 tons set sail for the East on a voyage of discovery, together with the idea of doing something to rid the archipelago of pirates. He reached Sarawak in August 1839, and the Rajah gave him permission to explore the interior. When he returned to the coast he found the Rajah sorely pressed by a revolutionary party. Brooke offered his services, and so effective were the measures he devised that the rebels were speedily forced to submit. The ability of the Englishman made so deep an impression on the Rajah, that in 1841, with the consent of the King of Borneo, Brooke became Rajah of Sarawak.

The territory lies on the route between Singapore and Hong Kong. It possesses splendid harbours unrivalled for naval purposes, and which in the hands of a hostile nation would have done incalculable damage to British commercial and naval interests. Yet the British Governments of the time failed to grasp its value as a link in our chain of communication with the Far East, and, beyond taking the small island of Labuan in 1846, left Borneo severely alone.

Out of a condition of chaos, James Brooke resolutely set himself to form Sarawak into a settled state. He established free trade, introduced a system of justice and law, and took stringent steps to suppress piracy. Pirates had long been the curse of the coasts, but the offering of a sum of money for the head of each marauder amounted to a war of extermination. The successful suppression of piracy in the eyes of misinformed humanitarians at home did not excuse the methods adopted by Brooke. He had to come to England to face a Parliamentary inquiry into his rule, and the costs nearly ruined him. Had it not been for the very material assistance of the Baroness Burdett-Coutts, James Brooke would have relinquished his rule in disgust, and Sarawak would have been lost to the Empire.

By 1847 the way in which Rajah Brooke had taken up the white man's burden was better recognised. On a visit to England in that year, he was made a Knight Commander of the Bath, and received the Governorship of Labuan. Time after time, Sir James Brooke appealed to British Governments to take over his territory. He pointed out the value of the position, the increasing trade, "one of the fairest countries on the globe," and an immense supply of coal. The Rajah met with curt refusals, Lord Derby in 1858 asserting that the colonies were already too numerous. Practically single-handed the white Rajah ruled over 50,000 square miles of territory, with a coast line of about 400 miles and a population of over half-a-million. He was so disheartened at the obtuseness of the British Government, that more than once he was on the verge of offering his country to France or Holland.

Rajah Brooke's successful government of Sarawak is one of the most interesting achievements of an Englishman abroad. By the most conciliatory yet firm methods, he controlled the native chiefs and utilised them in his rule. In 1857 the Chinese settlers raised an insurrection, but the Dyaks and Malays under Brooke suppressed it. In 1863 Sir James retired to England, leaving Sarawak in charge of his nephew Charles, who became Rajah five years later on the death of his uncle.

Sir Charles and Lady Brooke have ruled their little State with a kindly judiciousness that has been remarkably successful. "Trade has expanded, agriculture is advancing, piracy and head-hunting have been rooted out, education is in demand; and, as a result of the efforts of Christian missionaries, Sarawak now numbers several thousand native Christians."

The trade of Sarawak is increasing. Sago is the staple export, supplying half the world with the commodity.

	1900	1904
Exports . .	£687,000	£751,000
Imports . .	385,000	585,000

Kuching, the capital, stands on the left bank of the river Sarawak, 25 miles from the coast, although as the crow flies it is but five. It is 8700 miles distant from London; transit, 30 to 35 days.

Brunei.—The Sultan of Brunei is under British protection. He rules over an area of about 15,000 square miles and a population of 45,000. The trade is of little extent. *Brunei*, the capital, is built on an island-studded expansion of the river. "Rickety huts with slippery steps leading up to their dilapidated entrances, canoes of all shapes and sizes, stretches of fishing stakes, Chinese stores, little brown urchins gambolling and splashing in the water, and a multiplicity of stenches" are the most striking features of the city.

British North Borneo.—About 31,000 square miles in the north of the island is under the control of the British North Borneo Company, under a charter granted in 1881. A protectorate was proclaimed in 1888. The territory is administered by a Governor, assisted by a Council, and by Residents in charge of districts and provinces. Up to the present time, British North Borneo has been a land prolific in promise but scanty in performance. Although progress has been slow, the prospects are not discouraging. Its forests contain "millions of tons of timber, hundreds of thousands of tons of cane, and tens of thousands of tons of gutta-percha, and india-rubber." When advantage can be taken of this natural wealth, the trade of the territory will show a remarkable expansion. At present the exports chiefly consist of wax, birds' nests, cocoa-nuts, gutta-percha, sago, tobacco, rattans, india-rubber, and beche-de-mer. There is an increasing trade in timber with China. Tobacco planting is a very promising industry. There is a railway of 110 miles, and the telegraph connects *Sandakan*, the capital, with the point where the branch of the Singapore and Labuan cable touches the island.

Sandakan is 9500 miles distant from London; transit, 35 days. Telegrams average 5s. per word.

NOTES ON AN EXPERIMENTAL COURSE OF LESSONS ON AIR AND WATER.

BY EDWARD J. RUSSELL, D.SC. (LOND.),

Lecturer in Chemistry at the South-Eastern Agricultural College, Wye.

(*Continued from p.* 80.)

SINCE water expands on freezing, it follows that ice is lighter, bulk for bulk, than the water from which it is formed. Ice, therefore, floats on water, and pictures of icebergs may be shown in illustration of this. The following interesting experiment was discovered by a Dutch schoolboy :—

Experiment 103.—A piece of ice is floated in water in a tumbler or beaker, and water added to the brim. If the piece selected has the correct shape, the ice will project well out from the beaker, yet as it melts the water does not overflow. The result appears somewhat paradoxical, but the explanation is really a very simple deduction from a principle in hydrostatics known as the law of Archimedes.

Solution.

Probably no substances excepting metals are altogether insoluble in water, and the teacher will hardly be able to say definitely that some things dissolve in water and others do not. The distinction is one of degree only; a soluble body is one that dissolves readily, and an insoluble body only dissolves with difficulty. When the teacher dissolves salt or sugar in water and asks what has happened, the children will probably say the substance has melted, and there is so much in common between the two processes that they may be allowed to use the word.

Experiment 104.—Stir up salt or sugar with water; after a time it dissolves, forming a perfectly clear liquid. Fold a circular filter-paper first to a half-circle and then to a quadrant and fit into a glass funnel; if you have no filter-paper a circular piece of blotting-paper answers admirably. Pour the liquid through, and notice that no residue is left behind. Then evaporate the filtrate, and the solid is recovered. The process should be carried out in a porcelain evaporating dish, and not in a beaker.

Do not attempt to explain why the salt cannot be seen in solution. Even the most distinguished physical chemists would hesitate before offering an explanation of what exactly happens on solution, and would recognise that any attempt was purely tentative, and the teacher may, without loss of dignity, follow their example. Above all, do not proceed to state that water is "porous" and the salt fills up the "pores" and is therefore invisible: this statement, which is sometimes quite seriously made, is so extremely inadequate and incomplete as to be of no possible value.

Experiment 105.—Stir up some powdered chalk with water, filter and evaporate the filtrate as before. The chalk is nearly all recovered on the filter, little, if any, being found in the evaporating basin. It therefore did not dissolve, but was "suspended" in the water, or "in suspension."

A soluble body passes through a filter, and can only be removed by evaporation; an insoluble body does not pass through a filter (if the filter is sufficiently fine), and may therefore be separated in this way.

Experiment 106.—Soluble and insoluble coloured bodies may be prepared in very simple ways and used for the above test, *e.g.*—

Copper sulphate and ammonia give a blue soluble body.

Potassium sulphocyanide and ferric chloride (iron perchloride) give a red soluble body.

Ammonia and ferric chloride give a red insoluble body.

Mercuric chloride and potassium iodide give a salmon insoluble body.

Lead acetate and potassium bichromate give a yellow insoluble body.

And so on.

If water, instead of being quite pure, contains some acid, it will dissolve bodies much more readily.

Experiment 107.—Leave a bone for some days in water containing hydrochloric acid, changing the liquid occasionally. The mineral matter dissolves out, and the bone becomes quite soft.

Experiment 108.—Pass carbonic acid (prepared as before from marble and hydrochloric acid) into water containing chalk in suspension. The chalk dissolves, but is thrown out of solution again as soon as the carbonic acid is removed by boiling or by a current of air. As carbonic acid is given off from plants and decaying organic matter it occurs in quantity in the soil, and will dissolve in water as it percolates downwards. The class should deduce that chalk in the soil will therefore dissolve and be found in the well or spring water, but may be recovered on boiling, when it forms the "fur" of kettles or saucepans, or in certain circumstances, when it comes in contact with the air, forming stalactites, stalagmites, etc.

This deduction may be verified by treating the "fur" with hydrochloric acid, and collecting and testing the carbonic acid produced; also by testing any well water for chalk; the simplest test being to add a solution of ammonium oxalate, which produces a white precipitate.

As it is contrary to the spirit of these lessons for the children to take anything on the authority of the teacher, the test should be preceded by a trial with the filtrate from shaking chalk with water; this will generally give a copious precipitate with ammonium oxalate.

Petrifying wells and springs owe their properties to this same cause.

Experiment 109.—As a consequence of the power possessed by water of dissolving bodies it follows that natural waters are never pure. In an early experiment it was found that water contains air in solution; evaporation in a clean basin will show that mineral matters are dissolved also.

Changes accompanying Solution.

These are so complex, and at first sight so erratic, that they may well be passed over in day-school work, but for evening scholars the following may be illustrated :—

Change in volume.—As a rule there is a contraction, which naturally shows up best when a liquid dissolves in water.

Experiment 110.—Take a long narrow tube divided into three equal parts by gummed paper strips, pour in strong sulphuric acid up to two of the divisions and

water to the third, colouring with litmus to render the experiment visible. Cork well and shake up; considerable contraction takes place.

Changes in temperature.—Sometimes heat is absorbed, sometimes it is evolved.

Experiment 111.—Dissolve ammonium nitrate or potassium sulphocyanide in water; a great lowering of temperature is produced. Sugar dissolving in tea cools it somewhat.

On the other hand, when sulphuric acid or caustic potash dissolve in water there is a great rise in temperature, which may either be demonstrated by passing the vessel round the class, or by the pretty device known as the "ether thermometer."

An ether thermometer consists of a bulb blown on to a glass tube about four inches long and one quarter-inch diameter. Partly fill with ether, plunge into the heated liquid, the ether boils and the vapour may be ignited at the open end.

Natural Waters.

It is evident that rain water collected before reaching the ground is the purest form of water occurring in nature, for it will be contaminated with atmospheric impurities only. If it reaches the ground and washes into ditches or rivers it takes up mineral, vegetable, and animal substances, whilst if it percolates through the soil to form springs or deep wells more mineral matter is dissolved. But one must not make the mistake of supposing that deep well or spring water is more impure than surface water; the soil and the countless bacteria occurring therein have a remarkable purifying effect, and remove or destroy most of the organic matter, which is the impurity most to be feared. The soil plays a very curious rôle in first contaminating and then purifying the water.

Experiment 112.—Evaporate in separate dishes 50 c.c. of rain water, river water, and spring or tap water, and compare the residues. As a rule the first is very small, the second dirty, and the third larger than the first but clean. If you can weigh the basins before and after the experiment, and so get the weight of the residues, an exact comparison becomes possible.

Experiment 113.—Filtering cannot remove soluble matter, but only suspended bodies. Repeat the last experiment, filtering the water through filter-paper or white blotting-paper before evaporation. The tap water gives exactly the same residue as before; the river water, however, will probably show an improvement.

It is not necessary to teach children that all drinking water should be filtered; the process is usually unnecessary, and, if the filter is dirty, is sometimes positively harmful. Village well water may want boiling, but a good town supply should be quite pure enough without further treatment. In any case, filters which allow bacteria to pass are of little or no utility.

Impure water may be purified by distillation.

Experiment 114.—Fit a litre flask with a good cork, bored to allow a somewhat wide tube to enter, and connect with a Liebig's condenser. Then pour some water, blackened with ink, into the flask and distil. Pure water passes out. The experiment may also be done with sea water or a strong salt solution, neither of which is improved by filtering.

Filtering will remove suspended bodies even though they are so fine as to be invisible to the naked eye, and only revealed by the microscope. An ordinary filter will not remove dissolved matter; this can only be separated by distillation. Membranes do exist, however, which are permeable to water and not to dissolved salts, and which will, theoretically at any rate, allow a separation to take place.

OBJECT-LESSONS IN HISTORY.

WARWICK.

THE best preparation for the now very popular School Journey and that which is recognised by the "powers" as being the most beneficial to those who are to take part in it, is to describe beforehand the place to be visited, and tell the reasons why such a place has been selected. By this means the appetites of the children are whetted, and a stimulus is given them to question their friends on what they are likely to see. Let the place be as brimful of history as possible. Let it cover as wide a period as possible. The reading will call forth things forgotten for the moment; it will bring new facts.

Our first OBJECT-LESSON IN HISTORY in the June number of the present year dealt with the old palace at Richmond, and was intended as a help to the metropolitan and near-lying district teachers. Our present will find material for those of the Midland Counties.

Warwick is easily approached from most places in the Midlands. From Birmingham, the metropolis, the journey is quite an easy one, the excursion fare for children being less than one shilling a head. The visit may well be made in an afternoon.

Such saving of pennies! Such looking forward to the day! Really the anticipation is a pleasure to teachers and children alike.

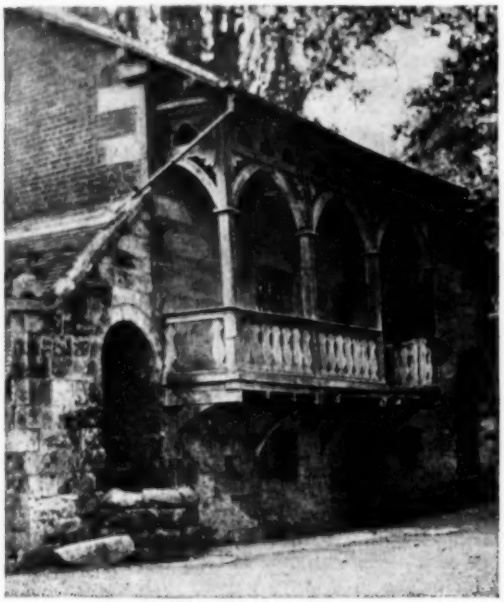
There is little or no excitement in the train. Indeed, one is out in the clean air and in the equally clean streets of the historic town before one is aware of it.

We follow the course of the lesson as given beforehand.

To Guy's Cliffe is the first part of the programme. To children, perhaps, the place is disappointing. They would like to see the real Guy and hear him tell his own exploits, and his own sorrows. They shall see his monument by-and-by. At present they must wend a mile or so along the famous Kenilworth Road, where once Elizabeth travelled on her way to the Kenilworth Revels. The first piece of history is thus brought to mind.

The mill is reached. It is a picturesque spot away down the avenue there a hundred yards from the road. The children gaze at it in wonder. The wheel is being turned by the water, which, having done its work, rushes under the road with a roar which is deafening. Its eddies are watched, and in the distance right in front is the noble pile of Guy's Cliffe House, the present home of the Percys. As we sit beneath a shady tree, where a seat has been conveniently placed, we again recite the story of Guy: how he, after all his adventures, loaded with honours by the king and yet wishful to be unknown, betook himself to this retreat, there to live the life of a recluse apart from the world; how his wife, the "Fair Phyllis," in complete ignorance

of his return and even of his existence, dwelt in her castle home; how Guy went in disguise to beg bread



GUY'S CLIFFE MILL, WARWICK.

from her hands every day and was discovered neither by attendant nor wife; how, at last, when he knew that death was approaching, he made himself known to her by sending her a ring; how in haste she came to his retreat just in time to exchange a parting adieu.

To the church! Built in the reign of Henry VI., during a turbulent period, it is dedicated to St. Mary Magdalene. Its interior has been made beautiful by the kindly disposition and munificence of the late Lady Percy. On the south wall is the immense effigy of the doughty Guy. The monument is eight feet high and sadly mutilated—mutilated either by the sands of time or by the rough usage of men in days when wrecking churches and despoiling them of their historic interest was thought to be the right thing to do. A side-light in history as the effigy is beheld!

From the church the distance is not far to Guy's Well. Here the earl was wont to quench his thirst, and as we turn and walk round the rock on which the house is built we come to Guy's Cave—

> "Where, with his hands, he hewed a house
> Out of a craggy rock;
> And lived like a palmer poor,
> Within that house alone."

In the cave the mighty warrior lies, at least so the report has been handed down, and, amid the quietness of the scene, a sort of hero-worship comes over the children—a hero-worship which a teacher longs to see. History, or legend—which?—has had its effect.

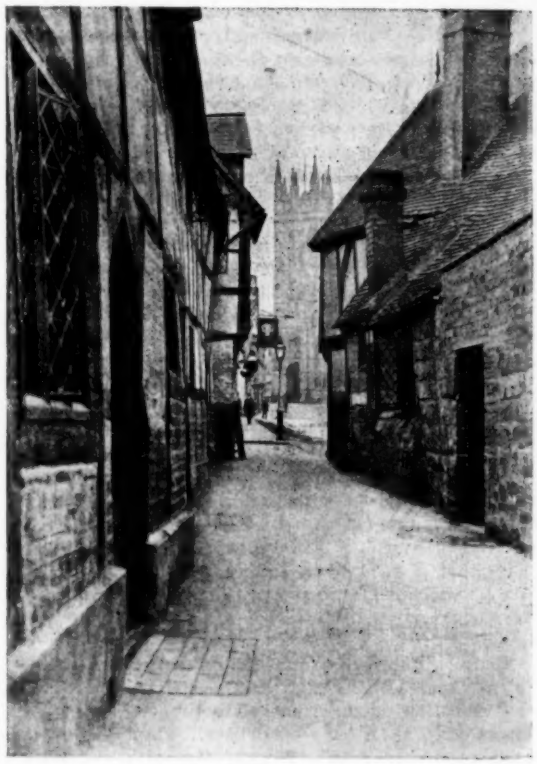
Were there time we should have visited a little hill not very far away, where a monument has been erected to mark the spot on which Piers Gaveston, that lawless baron, "the minion of a hateful king," perished at the hands of jealous barons no less lawless than himself. On the way to town, Piers Gaveston and Edward II. form the topic of conversation.

In Warwick one is puzzled to decide where to begin sight-seeing, for the town is full of charmed spots, but we keep as close as possible to the lesson we have beforehand given by way of preparation.

The "gate" is noticed and the lamentation made: "There are no gates in Birmingham." The OBJECT-LESSON is once more making its mark.

An aside crops up, for in the High Street the children notice a shop which is well worth a pause. In the window and hanging on the outside wall are to be seen objects which have been collected from all parts of the world from time to time and which are instructive. A huge man-trap hangs on the door-post and seems even now to warn people off the premises. An old Saxon chair in oak is quite an attraction, while the old sun-dial—for sale—is a curiosity worthy of a better place. If fixed in a correct position, it would not only tell the time here in England but the corresponding times of France, Russia, Turkey, Persia, Bombay, China, Japan, Australia, the South Sea Islands, Mexico, Florida, and Spain. A journey round the world, you see, in a few moments. A lesson in geography thrown in. The old engravings of Warwick and Kenilworth to be seen in the same shop are very instructive. They show how Time changes the aspect of things, and the fact that an electric car speeds by at the moment enforces the thought home. How different, again, things will be in a few years!

That pile of buildings at the end of the street is Leycester's Hospital. It presents one of the best-pre-



ST. MARY'S, WARWICK.

served half-timbered erections of which England can boast. The question of "Guilds" comes up unre-

hearsed. The name of Leycester recalls the famous earl whose name has already been on the tongues of the children many times during the afternoon. We enter the hospital by an arched gateway and pass the Master's house, not without a glance at the emblazonments above

LEYCESTER'S HOSPITAL, WARWICK.

—the crest of the founder being one of them. The Great Hall has been the scene of many splendid festivities, even royal ones, and the tablet which bears the inscription—

MEMORANDUM
THAT
KING JAMES THE FIRST
WAS RIGHT NOBLY ENTERTAINED AT
A SUPPER IN THIS HALL
BY THE HONORABLE SIR FULK GREVILLE
CHANCELLOR OF THE EXCHEQUER
AND ONE OF HIS MAJESTY'S MOST HONORABLE
PRIVY COUNCIL
UPON THE FOURTH DAY OF SEPTEMBER. ANNO. DOM.
1617
GOD SAVE THE KING

is much admired. It forms another topic of conversation. The curiously carved oaken coffer in the kitchen calls up earlier days, and the piece of needlework, said to have been the work of the unfortunate lady, Amy Robsart, is not devoid of interest—to the girls. Now a vase in the garden is descanted upon. The old pensioner, who has been told off as guide, tells that it is of Egyptian design and workmanship, and that it is a fine specimen of art from that remote clime; that below the crater was once a nilometer, an instrument used for the purpose of showing the rise or fall of the Nile, hence its name. This piece of antiquity appeals to the children in no less a degree than the history of the town itself. We have a moment or two in which to peep into the Hospital Chapel. It stands over the West Gate of the town, or what was once called the "Hongyngate"—here a mind-picture of gallows and highwaymen—and is well worth a visit. The

STATUTES OF THE FOUNDER

which are hung on the walls, and which are publicly read once a year, form a very interesting topic of conversation.

The museum of the town, or rather of the Warwickshire Natural History and Archæological Society, built over the Market Hall, contains many things of interest. The fact that they are carefully assorted and labelled is a piece of modern history.

After tea and a rest a visit is paid to the church. Some of the children—the boys in particular—are growing tired of seeing buildings and monuments. They want, so it would appear, to test the stability of this one. They must climb to the top. They must go up the tower. What English boys don't like to climb? Let them go. The tower rises to a height of 130 feet, and above the tower, at a further height of 44 feet—where the boys cannot go—are four pinnacles surmounted by vanes. There are ten bells, chimes, and a huge clock. The view from the top must be grand. The places visited on foot may be clearly seen, and the names of them, as they are repeated, form a sort of blackboard summary to the lesson. But come with us less ambitious ones among the tombs. Come and revel in the inscriptions. This one, cut in Old English characters and dated 1568—twelve years before the defeat of the Armada. The pulpit is quite modern. It is very handsome, and is made of the best English oak, grown in the finest deer-park of the Midlands. Our Freemason friends will like to read the inscription:—

To the glory of the great Architect of the Universe
and to commemorate the 60th year of the
reign of Queen Victoria
this pulpit was erected by the Freemasons of the
Province of Warwickshire
and unveiled by the Earl of Warwick in presence of
the Provincial Grand Master Lord Leigh
and the Freemasons of the Province
October 14th 1897.

The old colours in the transept and other parts of the church belonged to the Warwickshire regiments, whose officers have erected numerous brasses to the memory of brave comrades. The east window is large and of fine proportions, but its coloured glass is of quite a recent date—1879. The ponderous sarcophagus of Sir Fulk Greville is remarkable for the pithiness of its inscription:—

FVLK GREVILLE
SERVANT TO QUEEN ELIZABETH
COUNCILLOR TO KING JAMES
FRIEND TO SIR PHILIP SIDNEY
TROPHÆUM PECCATI

The "goodly tomb" of Earl Beauchamp is situate near the centre of the Ladye Chapelle. About the middle of the seventeenth century the floor of the chapel gave way, and the Earl's coffin being either accidentally broken or purposely unclosed, the body was perfect and fresh, but rapidly decayed on exposure to

the air. Part of the hair, which was rescued, was worked into rings and various ornaments by the ladies of Warwick. The children enjoyed the story very much. The girls wanted to see some of the rings. Do they believe history after all?

The most beautiful tomb is that of Elizabeth's favourite—Robert Dudley. It stands against the north wall in the Beauchamp Chapel. The statue of the earl is in armour, showing that which was in use in his days, while over the armour is a mantle on which is embroidered the badge of the Order of the Garter, as well as the collar of the Order of St. Michael.

Gazing eyes cannot linger too long in this beautiful place, for there are others yet to see, and we must hie to them. Before leaving, however, a few must go into the crypt, the entrance of which is from the churchyard. How fresh the air is after the inside stay! In the crypt is a good example of the ducking-stool. Some of the girls wonder how in the world the scolds could ever face their husbands again, but they do not know what women were in those days. Some say: "But is it all true?"

The way now leads to the castle described by Scott as "the fairest monument of ancient and chivalrous splendour which remains uninjured by time." Really it looks so. Hidden away from the town, but yet within sight from the bridge, to get to it one has to pass through a cutting in the solid rock for at least a hundred yards. Now the towers come into view—Guy's on the right, Cæsar's on the left. For some eight hundred years have these specimens of masonry withstood the elements and remained undamaged by assault. What historic events they could tell if only they could speak! Beneath the shade of an oak, while arrangements are being made for the necessary official guide, we rest and tell the children what they may expect to see in the castle. Unfortunately the gracious countess is away, or I verily believe she would conduct us round herself. Now we are off. Through the spacious courtyard and along the front we enter the castle, and, ascending a few steps, we are in the chapel passage. Paintings are here in all their beauty and value—priceless. That one by Vandyck of Prince Rupert is the most popular among the children. It recalls Cromwellian times, and is a link in the lesson's chain. The famous Guy, Earl of Warwick, comes into the story once more, for here is to be seen a rib of the dun cow killed by that warrior. Paintings are again discussed in the Compass Room, and, after that, a lengthened stay in the Armoury Passage permits all and sundry to examine the contents closely. They are all of a military nature: armour worn by Cromwell's soldiers, a Saxon battle-axe, a Turkish beheading-knife, weapons from the South Sea Islands, a fine suit of Saracen armour, Chinese daggers, arrows, and other weapons. The Great Hall affords another treat. Armour again! Guy's sword, shield, breastplate, helmet, staff, and tilting-pole, all of ponderous size and heavy to boot; a large bell-metal pot, Guy's flesh-fork, a joint of the dun cow, and the tusk and shoulder-blade of a wild boar which he slew. On the right of a suit of horse-armour is to be seen the armour worn by a Warwick at the battle of Lichfield, while near are Crusaders' and Saracens' helmets and vizors. That suit of boy's armour is, perhaps, to the children at any rate, more interesting than all the others. It was worn by the little son of Robert Dudley, though he never used it in war. Those antlers of the extinct Irish elk must be at least two thousand years old. Cromwell again! for here is his old helmet. Now the Wars of the Roses! for here is the mace of the King-Maker. A not-too-speedy rush through the Great Dining-Room, where we noticed the antique busts of Scipio Africanus and Cæsar Augustus, and we are out in the open once more. A peep at the famous Warwick vase and we shall have to return to the town. The vase is of the purest Grecian taste, and the pedestal bears the following inscription, which, if translated by the teacher in charge of the journey, will not only bring him renown as a classical scholar, but furnish the history of it as well:—

Hoc Pristinae Artis
Romanae Q. Magnificentiae Monumentum
Ruderibus Villae Tiburtinae
Hadriano Aug. In Deliciis Hobitae Effossum
Restitui Curavit
Eques Guelielmus Hamilton
A Georgio III Mag. Brit. Rege
Ad Sicil. Regem Ferdinandum IV Legatus
Et In Patriam Transmissum
Patrio Ponarum Artium Genio Dicavit
An. Ac. D. Clo. Dcclxxiv.

THE FORMATION OF PARLIAMENT.

BY HENRY SMART, M.A.

JUST as Elizabeth has been termed the Greatest of the Tudors, so Edward I. has been called the Greatest of the Plantagenets. In each case the name is well deserved, and in each case the chief characteristic of the sovereign was an understanding of the nation and a working for its welfare. Edward has had bestowed upon him the further honour of being termed the father of both the House of Lords and the House of Commons. Since in his reign Parliament took a definite shape it will be our duty to examine his claim to this title. A rival claimant for the honour of being considered the creator of the House of Commons has sometimes been set up in the person of Simon de Montfort, Edward's uncle; but we notice at once that very diverse views are held as to his claims to greatness on this account, and we are therefore inclined to examine him somewhat suspiciously.

We shall find in the rise of Parliament, as in so much else of history, that it was not a case of sudden revolution, but of gradual growth. Our first impression is, one jump at 1265 and another at 1295; and this impression is favoured by such statements as that the House of Commons was "practically created in the reign of Henry III. by Montfort." But we find as we go on that there are other landmarks linking up these with the past. The years 1265 and 1295 still remain important, but as marking rather stages of growth than times of revolution. This is a point worthy of the utmost attention, because it is all important in the study of history. There have been times of revolution, but there has been much more growth than revolution.

Most readers would consider we were going far enough back if we began with the Witenagemot. But perhaps some would prefer that we should start with the assemblies described by Tacitus in his treatise on the Germans: "On affairs of smaller moment the chiefs consult; on those of greater importance the whole

community; yet with this circumstance that what is referred to the decision of the people is first maturely discussed by the chiefs. . . . When all think fit they sit down armed. . . . Then the king or chief and such others as are conspicuous for age, birth, military renown, or eloquence are heard, and gain attention rather from their ability to persuade than their authority to command. If a proposal displease, the assembly reject it by an inarticulate murmur; if it prove agreeable they clash their javelins." The interest of this passage is twofold; its evidence of discussion on national affairs, and the division of powers mentioned in it, the assembly of chiefs having power to settle only the less important matters.

But interesting though this and other passages of the treatise are, the question arises, what became of these two gatherings after the invasion of and migration to England? It is then that we meet with the Witenagemot, and we at once find ourselves confronted with two theories as to its constitution; one that it was a continuation of the old assembly of chiefs or "principes," and the other that it was the popular gathering of all the freemen of the tribe, but that, owing to the physical difficulties, as kingdoms grew larger the right to attend was not exercised. Since these two opposite theories are championed by equally high authorities, the ordinary person may be pardoned if he refuses to make up his mind. But even if we do not make up our minds we may notice a few points. It is certain that all the freemen did not come. Sometimes a crowd of common people were present, as at the election of a king, but as a rule the number present was little over a hundred, and often less. These comprised members of the royal family, archbishops and bishops, abbots, ealdormen, and royal nominees. This was certainly not a popular, democratic assembly. On the other hand, if the common people had no right to come, how, as Freeman points out, did they manage to get in on those occasions when they were present? Thus it appears that of the two theories mentioned the latter is the simpler and the more plausible, while the former is better supported by facts.

But the question for us is, in what respects was the Witenagemot a parliament in our sense of the word? It was not an assembly of representatives, and the members were not elected. So far it was not a parliament. But, on the other hand, its meetings were frequent and regular. In early times it seems to have met twice a year, and in later Saxon times three times, at Christmas, Easter, and Whitsun. This is worthy of notice, because that Parliament should meet frequently and regularly is almost as important as that it should be representative.

Under the Norman kings a change took place in the name of this assembly and in the qualification of its members. William I. introduced the Feudal System, a statement about as true as that Edward I. created the House of Commons, and after the Conquest the Witenagemot became the Great Council, attended by Tenants-in-Chief. But although these were the members in theory, yet in practice a change soon arose. The fact that a man was a tenant-in-chief did not necessarily imply that he was a great landowner, and a distinction soon arose between the Greater and Lesser Barons. The Greater Barons received a separate summons to the council and to the host, and transacted their financial matters directly with the Exchequer; whereas the Lesser Barons received only a general summons to the council, and were summoned to the host and paid their taxes through the sheriff. The distinction appears under Henry I., and is laid down in Article 14 of Magna Charta. This distinction is very important. The lesser barons shirked attendance on account of the expense, time, and trouble involved; and thus it is evident that the distinction suited them. There is no doubt that it suited the greater barons equally well, for they plainly aimed at political power, and in their case the trouble of attending was repaid by the influence they had when there, which was not the case with the lesser barons. We notice also that this distinction was a blow at Feudalism as a system of government. "Feudality in itself was only a method of owning land; but it was always threatening to pass into a method of government."[1] This division of the barons added to the principle of tenure that of writ as a qualification for membership, and so began the process, completed by Edward I., of eliminating the political importance of feudalism. We say completed by Edward I., because, until then, though the lesser barons seldom came, yet they had the right to come, and the meeting at Oxford in 1258 was noticeable on account of their presence. Moreover, the number of barons receiving the special summons had varied, being smaller under Henry III. and Edward I.; but from 1295 "a Baron whose ancestor has been once summoned and has once sat in Parliament can claim an hereditary right to be so summoned."[2] It is this which constitutes Edward's claim to be considered the creator of the House of Lords.

Since then the membership of the House of Lords has been increased by Letters Patent, the custom begun by Edward III. and used pretty freely by Richard II. But it is to be observed that although life peers may be created, yet there can be no seat in the House. Thus we see the various principles which have been at work in forming the Upper House—tenure, writ, letters patent; and we notice that a seat must be hereditary.

But, to return to the Norman "Magnum Concilium," although it met three times a year, yet it was certainly not elected, nor was it representative. Of course we might look on each tenant-in-chief as representing his sub-tenants; but, if so, why not look on the king as representing the former? For these two principles, of representation and election, we must look to the House of Commons, and here again we notice a gradual growth.

The two ideas are both seen used locally in financial and judicial matters long before they are applied centrally to political affairs; and doubtless the former use led to the latter. We cannot examine this question fully, as it involves a study of the rise of juries, and so must content ourselves with a few examples. (1) Perhaps the best known is the compilation of Domesday Book. In order to obtain trustworthy information, representatives of towns and hundreds were summoned before royal officials to answer on oath all the royal inquiries. When, in 1198, a new survey was necessary, much the same method of procedure was ordered. Here we have representation applied to financial matters. (2) Another instance of the same use is found under Henry II. After Saladin, aided by treachery, had defeated the Christians at the battle of

[1] Gardiner. [2] Stubbs.

Tiberias in 1187, and had followed up this success by taking Jerusalem, it was felt that a great effort must be made by Christian Europe. The "Saladin Tithe" was levied—the first tax on movables. Later on an inquiry was held into cases where people were suspected of having paid less than their proper amount. This inquiry was made by the evidence of representatives. (3) In criminal matters representation was adopted in the Assize of Clarendon, 1166. According to this law twelve men of each hundred and four from each township were to present criminals before the justices. Evidently these men were regarded as representatives, for accused persons were to go straight to the ordeal. (4) In the same reign, that of Henry II., we have the use of juries in civil cases, in what were called the assizes, the word Assize having here a different meaning from what it has above. For instance, there was the assize of Novel Disseisin, which was held to settle disputes as to ownership of land, some one complaining that he had been wrongfully ejected. On the complaint of the injured person the sheriff appointed four knights of the county, who chose twelve others living in the district to settle the dispute. In all these cases we must notice carefully the meanings of the words "assize" and "jury." We see, too, that although representation and election sometimes went together, yet the former did not imply the latter.

But although we thus see both principles at work, and the people were becoming accustomed to both ideas, yet instead of the representatives coming to the central government the latter went to them; in other words, there was no concentration of the representatives. This began in 1213. John had been reconciled to the Pope. But while under the Papal ban he had committed wrongs against the Church. An assembly was therefore called at St. Albans on August 4 to discuss the question of compensation. This meeting was attended by bishops and barons and by four men and the reeve from each town or royal demesne. We notice that thus early the Lower House was concerned with money matters. Moreover, the meeting may be considered as the beginning of Parliament, because it did not confine itself to this question of monetary payment, but also referred to John's illegal actions and talked about the laws of Henry I. Later in the year a meeting was called for November 7, at Oxford, to which each sheriff was to send four knights "ad loquendum nobiscum de negotiis regni nostri." Unfortunately, it is not known whether the meeting was held or not. If it was held, we have in John's reign meetings attended by representatives from both towns and shires.

Under Henry III. we find both progress and retrogression. The first step forward appears in 1254. The King was absent in Gascony and in need of money, as he often was. The Queen and Richard of Cornwall, the King's brother, who were acting as regents, therefore summoned to Westminster two knights from each shire for the purpose of obtaining a grant. These appear to have been summoned because the nobles would not answer for the common people.

But this was followed by a step backwards. We said above that the barons were aiming at political power, and this appears in the decisions of the Mad Parliament at Oxford. We may use the term "Parliament" because it was in this reign that it first appeared. This Parliament of 1258 was attended not only by the greater but by the lesser barons, and placed the government in the hands of committees. There were four of these, two of which concern us. One was composed of fifteen members, and was to assist the king; and another consisted of twelve members. These twelve were to meet with the fifteen three times a year, and it is this meeting which is often dignified with the name of "Parliament"; really it was a narrow oligarchy.

But it did not last long. In 1259 we have the complaints of the Knights Bachelors at their exclusion from power, and then followed a competition between king and barons for the favour of the common people. In 1261 three knights from each shire south of the Trent were called to St. Albans by the barons, and the king summoned the same knights to Windsor. In 1264 Simon's first Parliament met at London, and was attended by four knights from each shire; and in the next year we have Earl Simon's great Parliament. But we must not think too highly of this assembly. It was composed of the Earl's supporters. Of the nobility there were summoned five earls and eighteen barons, and those of the clergy who favoured Simon. Then there were, as we all know, two knights from each shire; but there were not two representatives from "each" town, for members were called from only twenty-one towns, and writs to these were sent direct, and not through the sheriff, so that evidently in their case careful selection was necessary. When we remember that to Edward's Parliament of 1295 seven earls and forty-one barons were called, while during his reign one hundred and sixty-six cities and boroughs at various times sent members, we see how incomplete this Parliament of 1265 was as a representative assembly, and we see that there is ground for regarding Earl Simon's action as "the last despairing effort of a revolutionary partisan."[1] On the other hand, we must not underrate its importance, for it was the first time that representatives of both shires and towns met in the same assembly.

The completion of the work thus begun was due to Edward I., and he had many advantages. We must remember that the representation of the Third Estate was arising at about this time, not only in England, but in other parts of Europe—in Sicily, Castile, Aragon, Germany, and France. Edward's first wife came from Castile, and he had visited Sicily on his way home from the Crusade. Then, too, he had had experience in ruling in both Wales and Gascony, in the latter of which he had had some friction with Earl Simon. He was also able to profit by what he had learnt during the struggles of his father's reign, and had capable assistants.

The date with which we are all familiar in his reign is 1295, the year of the Model Parliament; but that was the climax, and was preceded by what may be regarded as experiments. Thus in January 1283, when Edward was in Wales with his barons, two separate councils were summoned, one for the north of England to meet at York, and one for the south of England, which was held at Northampton. These were attended by bishops, archdeacons, and heads of orders, and four knights from each shire, and two representatives from each town. Again, in 1294, four knights were summoned from each shire, but no representatives were called from the towns. On the other hand, representation went on steadily. In 1273, before Edward had arrived in England, a great

[1] Professor Tout.

assembly was held to take the oath to him; this was attended by the nobles, and by four knights from each shire, and four citizens from each city. In 1275 the Statute of Westminster I. was passed "by the community of the land." In September 1283 a Parliament met at Shrewsbury for the trial of David of Wales. On account of the nature of the proceedings, no clergy were present; but the earls and barons were there, and two knights from each county, and two representatives from each of twenty cities and boroughs. On this occasion Edward followed Simon's example, and sent the writs direct to the towns instead of to the sheriffs. Lastly, so far as we are concerned, for we are not going into all the details, we have the great Parliament of 1295.

Here, as is so often the case, we find constitutional advance due, in part at least, to the King's difficulties. Fighting in Wales had only just finished, and there was danger threatening from both France and Scotland. It was under these circumstances that writs were issued summoning Parliament to meet at Westminster in November. The writs summoning the Prelates declared it to be "a most righteous law," that "that which touches all shall be approved by all." It is worthy of notice that the clerical peers outnumbered the lay peers by two to one. In later years they lost this overwhelming preponderance, but they maintained a majority in the Upper House until after the dissolution of the monasteries; and but for that Act there is no doubt that the Reformation would not have been carried out so easily and suddenly under Henry VIII. But to this Parliament of 1295 not only were the bishops and abbots called, but also heads of chapters, archdeacons, and representatives of lower clergy. Then, in addition to the earls and barons, there were called two knights from each shire, and two representatives from each of one hundred and ten cities and boroughs.

We have now carried this sketch far enough. But several points remain to be noticed.

With regard to the county members, we observe that the number was fixed; not that there were always two from each shire, but that there was always the same number of shires represented. Chester and Durham were palatine counties, and Monmouth was regarded as part of Wales, and there were therefore thirty-seven shires which sent members. Knights did not come regularly from the Welsh shires till 1536, after which date they sent one apiece, and Monmouth then became an English shire. Chester sent knights in 1543 and Durham in 1673. The knights were elected in the county court and received wages, which were fixed later at four shillings a day. The honour of being a representative was not sought after then so eagerly as now, and it was necessary to issue instructions that those elected must be "belted knights."

When the separation into two Houses took place, which was completed under Edward III., the knights went with the representatives of the towns, thus strengthening the Lower House. There were abundant reasons for their doing so. Like the burghers, they were representatives. Like them, too, at first their share in legislation was small. For instance, in 1290 the important statute "Quia Emptores" was passed by the nobles only; then, after the arrival of the knights of the shire, a money grant was made. The knights represented all the landowners of the county, not only the tenants-in-chief; and frequently a mesne tenant would hold more land than one who held "in capite." They were accustomed to working with town representatives in the county courts, and, like the burgesses, had need of protection against the great nobles. They were not great enough to share in the class interests of the nobles, but rather, like the citizens, had local interests. The practice of sending writs for the election of both town and county members to the sheriff doubtless helped this union, while the action of Simon in 1265 and of Edward in 1283, if followed, would have hindered it.

The number of borough members varied. The custom was to send writs to the sheriffs; but in the writs the towns to be represented were not specified, so that considerable power was in the sheriff's hands. Later on, in 1382, he was directed not to omit any town which had been accustomed to send representatives. Then, too, strange though it may seem to us, the towns were frequently unwilling to send members. If they sent representatives there were wages to pay them, two shillings a day; in addition to which burden the towns represented were taxed at a higher rate than the shires. There was difficulty in finding men willing to act, a state of affairs almost inconceivable nowadays; so much so that sometimes sureties were appointed, whose duty was to see that those elected really attended. This was possibly the reason why borough members for a long time played a very quiet part in Parliament; but probably, on the other hand, the small importance of the borough members was largely the reason why there was this reluctance on the part of both constituents and representatives. They felt as the lesser barons had felt under the Normans—that the small political power obtained was not worth the sacrifice entailed.

This unwillingness made it easy for the corporation or the gild of a town to secure the privilege of electing. The question as to who were the electors of the borough members is an obscure and complicated one, but often the choice was in the hands of the governing body. If we may pass on a few centuries we may point out that in this fact is to be seen the true significance of the Corporation Act of 1661. It meant that in many cases the election of the Parliamentary representatives of a borough would be entirely in the hands of members of the Church of England, and that the Nonconformists of the borough would be unrepresented in Parliament.

ASTRONOMICAL PROGRESS.

PROFESSOR H. H. Turner, Savilian Professor of Astronomy, Oxford, recently addressed the members of the Royal Institution on the subject of progress in astronomical science. He directed attention to what might be called the regular business of astronomy, such as was carried out by the National Observatory at Greenwich, which was founded under a warrant granted by Charles II. in 1675, for the purpose of finding out the latitude of places and improving navigation. It was at that time provided that the Observatory should be paid for "out of such moneys as shall come from the sale of old and decayed powder, the whole not to exceed £500." Not only had the Observatory grant been very considerably increased, but the rectifying of tables of the moon and of the heavens had also been kept steadily in view. How far we have progressed since that date may be judged from the fact that the first Astronomer-

Royal did not even know whether the earth was revolving uniformly or not. At the present time we seem to be approaching something like a solution of the great problem which the Observatory was founded to solve. A simple statement of the law of the attraction of one body by another became very complex when it had to be worked out in the form of tables. That complexity was seen by the ancient Greeks when they adopted their theory of epicycles. Commencing with two circles, they added a third, a fourth, and a fifth, until they abandoned the whole plan, because they feared it was too complex to represent Nature. Now it was known that their method was in essence correct, but instead of five epicycles, there were hundreds. It was not surprising, therefore, that the construction of the tables had occupied so many years. In 1860 a very great advance was made in lunar tables by a German named Hansen. He was without University education, and only able to learn mathematics in midnight hours, snatched from his work as a clockmaker, but his tables were probably the greatest scientific advance ever made at a single stride in practical astronomy. Though good, his tables were not perfect, and about 1880 they were corrected by Mr. Simon Newcombe. But there was an uneasy suspicion that some of the minor epicycles might not be altogether correct. During the last year, however, much of the doubt which existed in regard to this question had been dispelled.

A new theory of the moon, brought forward by Professor G. W. Hill, has been worked out by Professor E. W. Brown, and it affords satisfactory testimony to the accuracy of Hansen's tables. It has also been found that there is no greater discrepancy than a quarter of a mile in the radius of any epicycle. In the past there had been considerable neglect of the survey of the moon's surface, but that neglect had been put an end to by the work of two people—Dr. Franz in Germany, and an Englishman named Saunder, a hardworking schoolmaster, who had devoted his leisure hours to the study of the moon's surface. Mr. Saunder had measured some 1400 points on the moon's surface, and hoped to be able to indicate the height of the mountains on the moon. In the discovery of planets astronomers have certainly not been idle, for during the last ten years they have discovered at least 267, and it has been suggested that there are more to be found than all those which have been discovered up to the present time. Of late they have been having a merry time in the discovery of satellites. From 1685 nearly a century passed before a new one was discovered, and then Professor Herschel found two for Saturn. Since then the matter seems to have resolved itself into a match between England and America. England at first was well ahead, but lately the Americans had drawn nearer, and at present there was a dead heat, each country having seven satellites to its credit.

TRAINING IN CITIZENSHIP.

COUNTY COUNCIL OF THE WEST RIDING OF YORKSHIRE.

Scheme of Training in Citizenship approved by the Education Committee, 29th December 1904, *as part of the Secular Instruction in all West Riding Public Elementary Schools.*

Infants.	Standard I.	Standard II.	Standard III.	Standard IV.	Standard V.	Standard VI.	Standard VII.
1. Cleanliness (*a*) Clean hands, faces, and clothes (*b*) Clean habits, *e.g.* the proper use of the lavatory	1. Cleanliness (*a*) Use and care of parts of the body, *e.g.* hair, eyes, ears, nose, lips, teeth, hands, and feet (*b*) Care of clothing	1. Cleanliness (*a*) In the home (*b*) In the school playground and street, *e.g.* to desist from scattering paper and orange peel (*c*) Neatness in person and in work	1. Cleanliness (*a*) In town or village (*b*) Use of the bath	1. Manners (*a*) Cheerfulness and contentedness; evil of grumbling and fault-finding (*b*) Self-consciousness; evil of conceit and shyness (*c*) Modesty (*d*) Self-respect	1. Manners (*a*) Courtesy and respectfulness towards all (*b*) Self-restraint	1. Manners As shown by (*a*) Dress (*b*) Choice of friends, literature, and amusements	1. Patriotism (*a*) The vote; its nature and responsibilities (*b*) The nation and its government (*c*) Local government (*d*) Society as an organism, its development through the family, tribe, and nation.
2. Tidiness (*a*) In the home, school, and street (*b*) Personal tidiness, care of clothing (*c*) Care of furniture, books, toys, and other property	2. Manners (*a*) In eating and drinking (*b*) In question and answer, politeness (*c*) In bearing, quietness, unobtrusiveness, patience in waiting (*d*) Punctuality in the home and the school	2. Manners (*a*) In speech, courtesy, and clearness (*b*) In bearing, behaviour in the streets (*c*) How to perform a simple service, *e.g.* how to carry a message	2. Manners (*a*) Refinement of language (*b*) Behaviour in public places (*c*) Unselfishness	2. Humanity As shown by public institutions, *e.g.* the fire brigade, lifeboat, lighthouses, hospitals, asylums, red-cross society	2. Habits (*a*) How acquired (*b*) Habits to be cultivated and avoided	2. Patriotism (*a*) What our forefathers have earned for us, *e.g.* liberty, social and political institutions (*b*) How each individual may serve his country and posterity	2. Peace and War (*a*) International relations (*b*) Value of arbitration
3. Manners (*a*) Greetings at home, at school, and in the street (*b*) Punctuality and promptness	3. Kindness (*a*) To companions at play (*b*) To animals, birds, and insects, *e.g.* rabbits, birds and their nests, flies, worms, and other harmless creatures	3. Honesty (*a*) In work (*b*) Restoration of lost property (*c*) Preserving and protecting property at home, at school, or in public places	3. Humanity (*a*) Personal help to those in need (*b*) Making other people happy (*c*) Kindness to animals	3. Justice (*a*) Avoidance of injustice to others, *e.g.* in the spread of infectious disease (*b*) The justification for restraint and punishment in the home and the school	3. Patriotism (*a*) Duty of local patriotism, how to serve one's town or village (*b*) The value of local institutions	3. Peace and War (*a*) The value of peace and her victories (*b*) The evils of war	3. Justice (*a*) The development of the idea of justice from the earliest times (*b*) The development of the humane spirit in laws

TRAINING IN CITIZENSHIP—(*Continued*).

INFANTS.	STANDARD I.	STANDARD II.	STANDARD III.	STANDARD IV.	STANDARD V.	STANDARD VI.	STANDARD VII.
4. KINDNESS (*a*) To parents, elders, and teachers (*b*) To each other in the home, school, and street (*c*) To animals, *e.g.* dogs and cats	4. GRATITUDE To parents and teachers	4. JUSTICE (*a*) To companions (*b*) To the aged (*c*) To the less fortunate, *e.g.* the weak, imbeciles, stammerers, dwarfs	4. JUSTICE In thought, speech, and action	4. TRUTHFULNESS (*a*) In reporting, correctness, avoiding slander and gossip (*b*) In action, candour, not to act a lie (*c*) In thinking, eagerness for the truth	4. JUSTICE (*a*) To all human beings, irrespective of sex, age, creed, social position, nationality or race, and to animals (*b*) Between men (*c*) Charitableness in thought	4. JUSTICE (*a*) Love of justice (*b*) The value of Courts of Justice (*c*) Prevention of cruelty to animals	4. OWNERSHIP (*a*) Individual and collective ownership (*b*) Responsibilities of ownership
5. FAIRNESS (*a*) Mine and thine (*b*) Fairness towards others	5. FAIRNESS Ungrudging disposition, especially when the success of others is under notice	5. TRUTHFULNESS Promises and confidences	5. TRUTHFULNESS (*a*) All the truth and nothing but the truth (*b*) Avoidance of prevarication and withholding part of the truth (*c*) Avoidance of deception through manner or gesture (*d*) The importance of frankness	5. HONOUR (*a*) In the eyes of others, trustworthiness (*b*) In the eyes of self, self-respect (*c*) Avoidance of false pride	5. TRUTHFULNESS (*a*) Respect for differences of opinion (*b*) Living for the truth (*c*) What men have sacrificed for the truth	5. OWNERSHIP Talents and opportunities, responsibility for the use of	5. THRIFT (*a*) Simplicity of living (*b*) The evils of debt and gambling
6. TRUTHFULNESS (*a*) Confidence in parents and teachers to be encouraged	6. TRUTHFULNESS (*a*) In speech the importance of exactness, the avoidance of exaggeration (*b*) In manner the importance of simplicity, the avoidance of affectation	6. COURAGE (*a*) To follow good example and to resist bad example (*b*) To confess faults (*c*) Under difficulties, self-reliance	6. OBEDIENCE (*a*) Immediate and hearty obedience to parents and teachers (*b*) Respect for rules and regulations	6. COURAGE (*a*) The importance of courage, avoidance of bravado (*b*) Moral courage (*c*) Presence of mind (*d*) How to avoid panic (*e*) Heroic deeds done in the service of man (*f*) Everyday heroism	6. ZEAL (*a*) The value of zeal and energy in overcoming difficulties	6. TRUTHFULNESS (*a*) Conquest of science over ignorance and superstition (*b*) Progress of truth (*c*) Love of truth	6. CO-OPERATION (*a*) Between citizens (*b*) Between nations; interchange of thought, arts, and material productions
7. COURAGE (*a*) When alone (*b*) Darkness, shadows, and strange noises	7. COURAGE (*a*) Cheerful endurance of little pains and discomforts; manliness (*b*) In relation to creatures inspiring instinctive fear in children, *e.g.* mice, frogs, spiders, and beetles	7. SELF-CONTROL (*a*) In food, preference for plain and wholesome fare (*b*) In bearing, the avoidance of wilfulness, peevishness, obstinacy, sulkiness, violent temper, and quarrelling (*c*) In speech, the avoidance of rudeness and hastiness (*d*) In thought, checking of evil thoughts	7. ORDER (*a*) The value of system, *e.g.* a place for everything and everything in its place (*b*) The value of punctuality (*c*) The value of promptness	7. PRUDENCE (*a*) Need of forethought and care in speech and action (*b*) Temperance in eating, in work, and in pleasure (*c*) Abstinence as a duty to ourselves and to others	7. THRIFT (*a*) Money; its uses and abuses (*b*) Economy in little things (*c*) Avoidance of extravagance and wastefulness (*d*) Abstinence as a form of thrift	7. THRIFT (*a*) How and why to save (*b*) Savings Banks (*c*) The evils of drunkenness	7. THE WILL (*a*) The training of the will (*b*) The right to be done intelligently, unhesitatingly, thoroughly, cheerfully, and zealously
—	—	8. WORK (*a*) Helping in the home (*b*) The value of industry in the school	8. WORK (*a*) Perseverance in work; hard or distasteful tasks (*b*) Perseverance in play	8. WORK (*a*) Pride in thorough work (*b*) Use of leisure time; value of hobbies (*c*) Perseverance in self-improvement	8. WORK (*a*) The necessity for dignity of labour (*b*) The earning of a living; different pursuits — their responsibilities and social value	8. SELF-KNOWLEDGE (*a*) The need to know ourselves and to test our moral progress (*b*) The claims of conscience (individual and social) (*c*) The enlightenment of conscience	8. SELF-RESPECT Self-respect and self-restraint in thought, word, and action 9. IDEALS The value and beauty of an ideal for life

COUNTY HALL,
WAKEFIELD, *January* 1905.

W. H. BROWN.

THE N.U.T. EASTER CONFERENCE, 1906.

The Scarborough and District Teachers' Association has set to work in good earnest to make the Conference of 1906 an unqualified success. Under the direction of Mr. G. M. E. Hamilton, the General Treasurer, very successful meetings have been held, with the result that the work is definitely outlined, and the various Sub-Committees are either already at work or are formed ready to commence in the autumn. The officials and public of the town are viewing the visit with pleasure and enthusiasm, whilst most of the local worthies have become Honorary Members of the Conference Committee, thus ensuring a fitting welcome to the delegates on the opening day. The well-known Grand Hall on the Spa has been secured for the Conference Hall, and a suitable building on the sea front is being engaged for the Publishers' Exhibition.

Of other rooms suitable for sectional meetings there is abundance of choice.

The Officials of the Conference are:—

Chairman: Mr. W. R. Drummond, Harlaxton House, Alexandra Park, Scarborough; Vice-Chairman: Mr. W. Foster Smith, St. John's Villas, Filey; Treasurer: Mr. J. G. Brewin, 14 Nares Street, Scarborough; Secretary: Mr. J. W. Estill, 140 Prospect Road, Scarborough.

The Secretaries of Sub-Committees are:—

Ball—Miss A. J. King, 8 Avenue Road, Scarborough; Mr. H. Razzall, 1 Clifton Street, Scarborough. *Benevolent Purposes*—Miss M. Simpson, 29 Garfield Road, Scarborough; Mr. J. S. Wray, 16 Lyell Street, Scarborough. *Conversazione*—Miss I. Simpson, 1 Albert Row, Scarborough. *Excursions*—Mr. A. Burnley, 44 Gladstone Road, Scarborough. *Ladies*—Miss Craven, Friarage Council School, Scarborough. *Press*—Mr. R. Herbert, 191 Prospect Road, Scarborough. *Publishers' Exhibition*—Mr. H. Hopper, 8 Trafalgar Square, Scarborough. *Reception*—Mr. S. V. Fern, 10 York Place, Scarborough.

The Practical Infant-School Teacher.

OUR MODEL INFANT SCHOOLS.

AN APPRECIATION.

IT was the good fortune of the writer to find himself, a few days ago, in one of the most beautiful villages of the beautiful county of Warwick. Feeling, as he does, a keen interest in young people's instruction, he made his way to the Infant School. It was conveniently and somewhat conspicuously placed in a lovely winding lane where the cottagers had embellished their tiny windows and front gardens with flowers. The flower garden, too, of the school had not been uncared for. In it flourished pelargoniums, marguerites, peonies, and papavers of several sorts, the most showy of all perhaps being the *Papaver orientale*, mixed together so closely as to make one wonder how each found room for itself. Along the playground, beneath a high wall which shelters from the cold east winds, is a plot of ground some four feet in width, which the children have had allotted to them for their own. Tiny hands work in it with tiny spades and forks and rakes; tiny minds are helped by the mistress's full-blown ideas on gardening and knowledge of plants; tiny plots furnish vigorous plants, not the smallest of which is the *Heracleum giganteum*, whose flowers are said to be as large as a waggon-wheel, and whose lower leaves already trail some distance from the plot on to the gravel of the yard. This stately plant is not in bloom at this moment, for blossoming time is not yet at hand, but its stem and foliage certainly promise a bloom, if not as large as a wheel, something nearly as large. Indeed it seems capable of producing a waggon-load of wheels.

WEEK I.

WEEK II.

WEEK III.

WEEK IV.

FIG. 1.—CRAYON DRAWING.

It was the interest the writer showed in the garden and its flowers that was the *Open sesame* to an interview with the mistress for the *Practical Teacher*.

"Grant an interview? Certainly, and may many derive advantage from it."

The mistress, a Cheltenham-trained lady, was as full of praise for this magazine as she was keen on her

horticultural and botanical ventures. Always a lover of flowers, she took a deeper interest in her children's cultivation of them from her reading the instructive and sympathetic articles which appeared some time ago from Miss Lucy Latter's mind and pen. More than this, the valuable help she has obtained, and is still obtaining, from the current

SUGGESTIONS FOR CARRYING OUT THE OCCUPATIONS IN CONNECTION WITH THE CORRELATED SCHEME OF WORK

induces her to say that the pages of the magazine which are devoted to the interests of Infant School teachers are quite worth the money paid for the complete issue. This should be, and no doubt is, an encouragement to the editor and all those who have to do with the production of the articles, for surely this lady cannot be alone in such appreciation. Further, she was once of opinion that, in a small school, a village school, where the children are not so widely intelligent as their less fortunate brothers and sisters of towns and cities, it was of little use to extend her influence into spheres other than

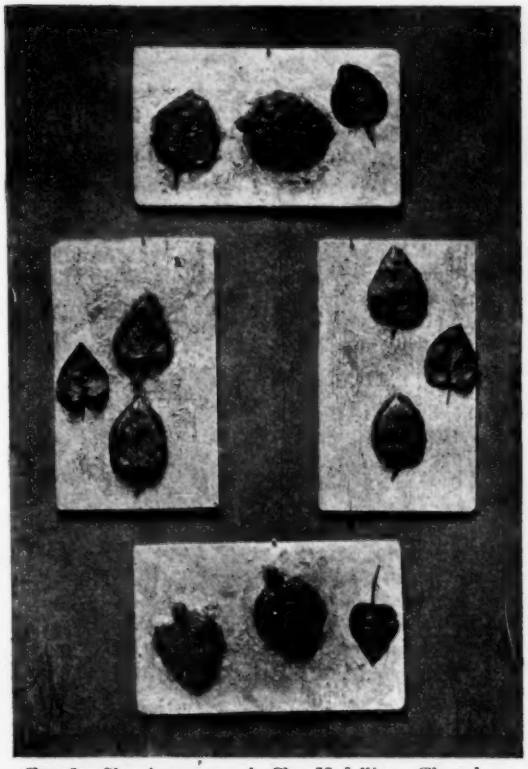


FIG. 2.—Showing success in Clay-Modelling. There is a natural leaf and two clay-models on each board.

belonged to the ordinary school routine. The Three R's and a game or two used to satisfy. Now, nothing is too much or too great. The writer of this interview once wrote in the *Teacher's Art Monthly*, this magazine's companion: "Make an attempt; you have nothing to lose, but you will be sure to gain." The advice was in connection with the teaching of brush-drawing, but our appreciative lady extended it to correlation and has gained. She was bold enough to make a beginning, was persevering enough to continue through the tedious and tiresome stage that follows, and now is the joyful beholder of the happiness that comes of success. She made a start under difficulties, and has progressed more steadily than even the most sanguine would have expected.

We pass over details of the general work of the children, for our purpose is to deal exclusively with our CORRELATED SCHEME OF WORK.

There was some difficulty at first with regard to apparatus, and even a little difficulty with regard to where it should be kept when procured, for the school funds were low and cupboard space was limited. The vicar advised a school concert; but, the time being summer, that was not approved of. His daughter advised a "garden party," and this brilliant idea was

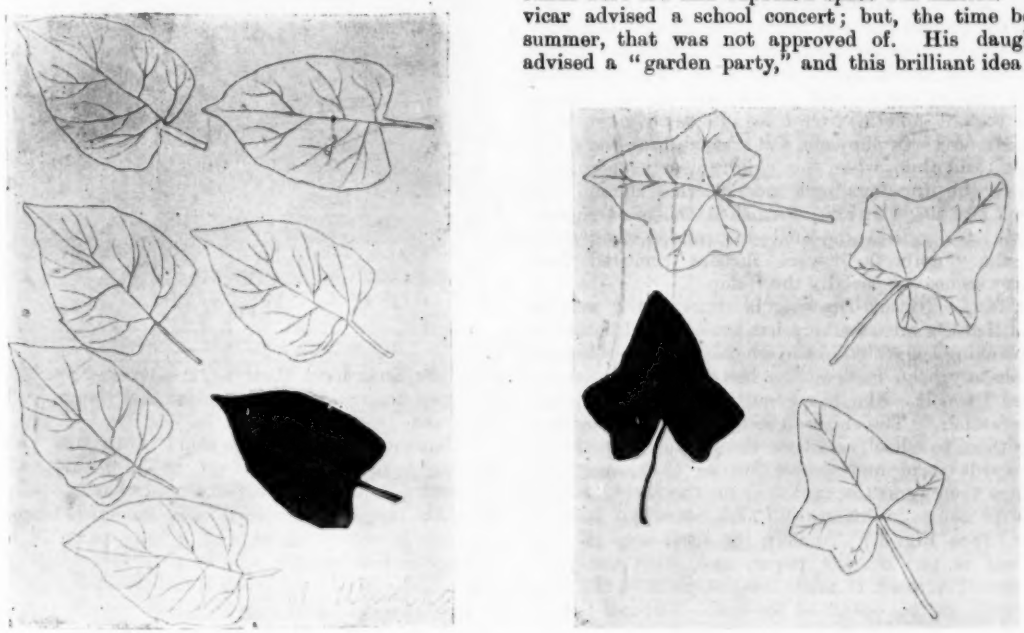


FIG. 3.

added to by the mistress' own plan of having a "Parents' Day at School." When the appointed day came round, the school was suitably decorated with flowers. Specimens of the paper-work of the older children, slate-work of the little ones, sewing specimens, and a few copies of pencil-drawing lined the bare places on the walls. The idea was a novel one. It drew. The parents came. Friends came. It seemed as though the whole work of the village had ceased. The blacksmith was there. His striker was there. The butcher's cart drove up, and the butcher's wife got down from it, and fairly rustled into the school. The little children sang to open-eyed and open-mouthed "old scholars," as most of the visitors proudly said they were, and, when hearts were opened too, the vicar made a speech. Such a happy one! It electrified hands into pockets and purses, from the pockets pence for the most part, and from the purses a little "siller"—nineteen shillings and eightpence in all. Thus, before the company had passed into the vicarage grounds for the "garden party," the initial difficulty was overcome. The second difficulty never made its appearance at all, for space for storage was found readily enough. What did prove a task was—how to spend that nineteen shillings and eightpence. Advice and help, however, were obtained from a master of a well-known school in a town not far away, and this is how the money was spent:—

Zinc-lined box to hold half-cwt. of clay . .	3s. 6d.
Clay, half-cwt.	3s. 8d.
2 doz. modelling-boards	7s. 0d.
2 doz. brushes, No. 5	3s. 0d.
Water-colour in tubes—assorted colours . .	2s. 6d.

It is of no use to tell half a story. Let the whole truth be out. Brush-work was found to be a most difficult and trying subject. The little ones could not get the colour to stay where it was wanted, where it was put. It *would* run. It was too thin, of course, and the papers were held too upright on the pads. The brush, too, was provokingly erratic. It *would* drop from the fingers and roll down a fairly executed copy. That is all overcome now, and the specimens of work that can be shown are a proof of it. Clay-modelling was a decided success, and so, too, was crayon-drawing. (See Figs. 1 and 2.) Oral lessons were given week by week on these subjects, talks afterwards were conducted, and then, when the children were thoroughly primed, the drawings and models were done. The "cow" and the "turnip" furnished the most successful talk; for, as it can be easily understood, the "ship" and the "umbrella" were farther removed from country scenes—especially the "ship."

As far as Nature-Drawing is concerned it may be added that the mistress here has not confined herself to the teaching suggested in the scheme to which reference has already been made. She has, in her opinion, improved upon it. She has gone, in common parlance, "one farther." The children select leaves of their own, bring them to school, and then draw them as faithfully as regards form and proportion as they can. The mistress then gums the real leaf on the sheet, and the whole presents an interesting and educative piece of work. (See Fig. 3.) To help the little ones in form the leaf is put on the paper, and, with the point of a pencil, a mark is made at the point of the stem and at the various points of the leaf. The leaf is then removed and the lines are drawn. This is helpful, though the practice must not be allowed to continue too long or too much reliance may be set upon it. It reduces the drawing to something after the nature of Template-Drawing, a form of work which is of most use to the "babies" and the very young children only.

As nearly always happens when a school undertakes the teaching of a new piece of work, the interest extends to the other departments. The mistresses of the girls' and infants' schools here are closely allied in friendship. They live in the same rooms, and share each other's companionship to the full. They talk things over and make plans together. The result? An extension of work in the same direction, and practically on the same lines, in the girls' school. It is no uncommon thing for the little ones of the infants' school to be seen trotting up to the "school for older children"

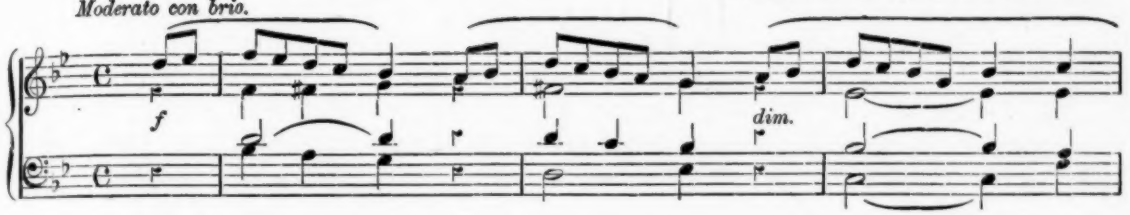
FIG. 4.

that they may have their work seen and appreciated. The encouragement to both older and younger is quite apparent. (See Fig. 4.)

What more remains to be said? Only this: that the schemes as set out in the *Practical Teacher* are workable in every detail. It is not expected that every branch of work suggested—stick-laying, &c.—will or can be adopted in every school, but if only parts of it are attempted the benefits will be sure to be felt. Once the initial difficulty is overcome, the rest of the way is as easy as a child learning to walk.

A SONG OF SPRING.

Words and Music by THOS. J. HEWITT.

Moderato con brio.

TREBLE.

Doh is B♭.

mf

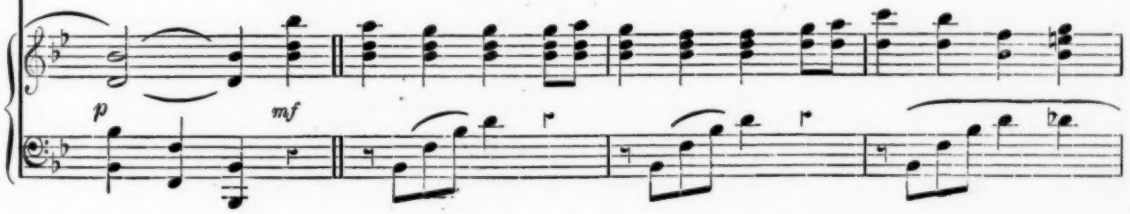
{| : :d ‖ t, :l, | l, :l, .t, | l, :s, | s, :l, .t, | r :d | s, :l, }

Come, chil - dren, sing of the mer - ry Spring, When the fields with flow'rs are

ALTO. *mf*

{| : | :d ‖ t, :l, | l, :l, .t, | l, :s, | s, :l, .t, | r :d | s, :fe, }

Come, chil - dren, sing of the mer - ry Spring, When the fields with flow'rs are



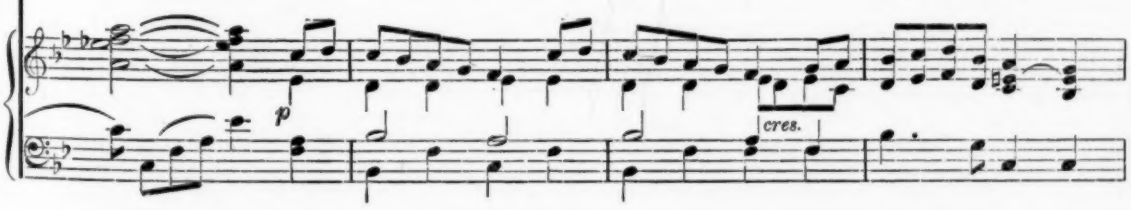
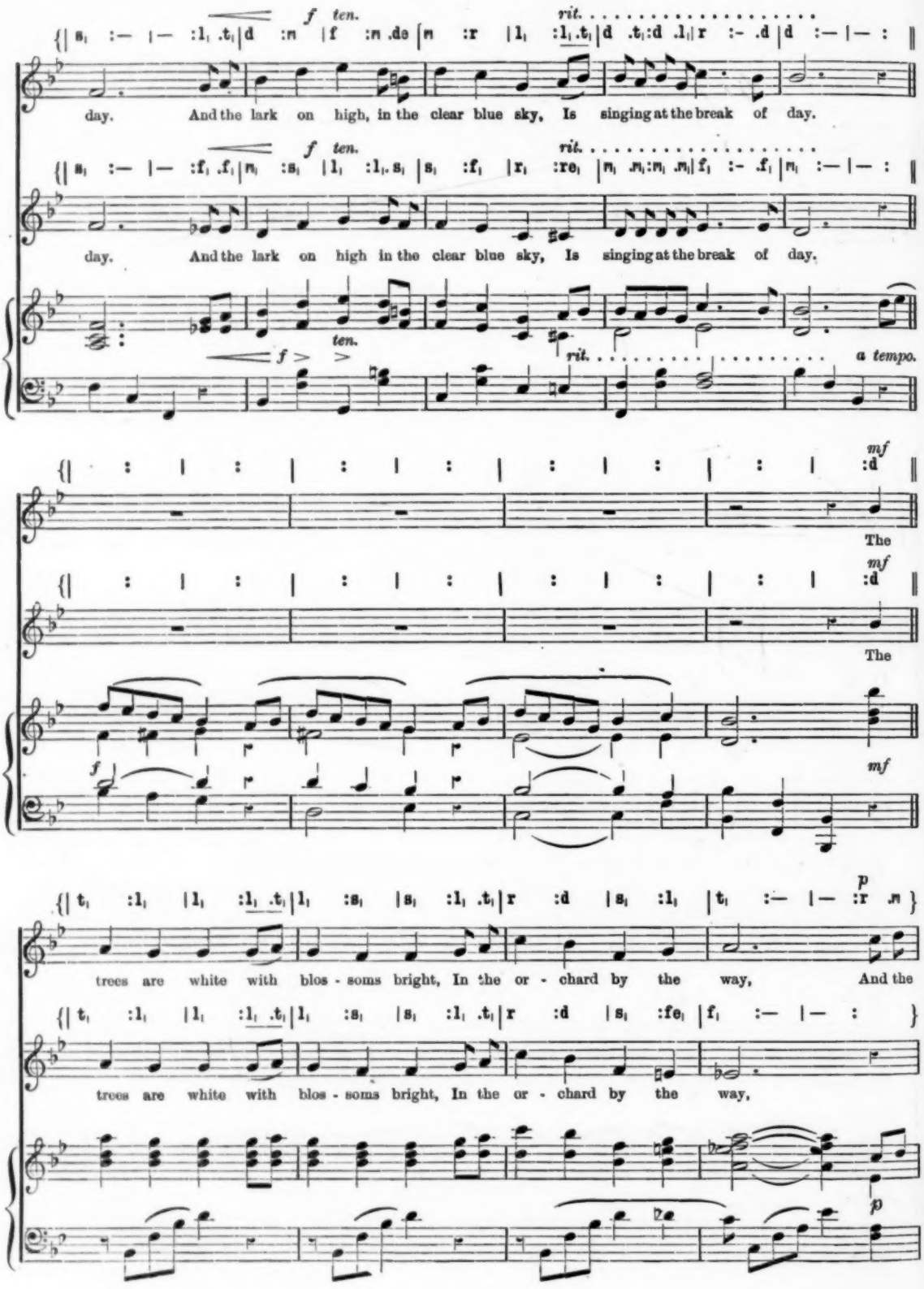
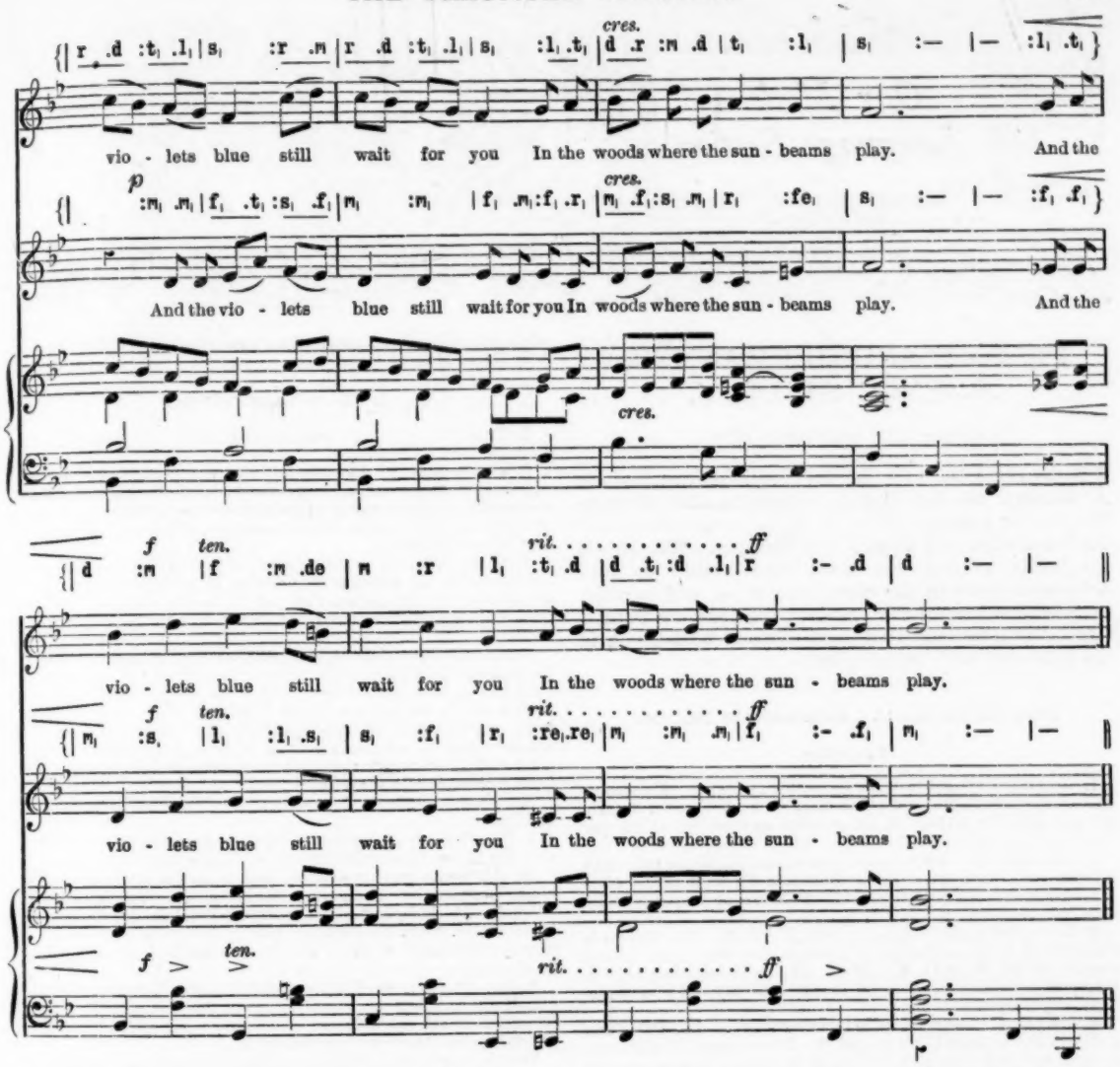
p *cres.*

{| t, :— |— :r .m | r .d :t, .l, | s, :r .m | r .d :t, .l, | s, :l, .t, | d .r :m .d | t, :l, }

gay, And the lark on high, in the clear blue sky, Is sing-ing at the break of

p *cres.*

{| f, :— |— : | :m, .m, | f, .t, :s, .f, | m, :m, .m, | f, .m, :f, .r, | m, .f, :s, .m, : r, :fe, }

gay, And the lark on high, in the clear blue sky, Is sing-ing at the break of

f ten.
rit.
day. And the lark on high, in the clear blue sky, Is singing at the break of day.
f ten.
rit.
day. And the lark on high in the clear blue sky, Is singing at the break of day.
ten.
f
rit.
a tempo.
mf
The
mf
The
f
mf
p
trees are white with blos - soms bright, In the or - chard by the way, And the
trees are white with blos - soms bright, In the or - chard by the way,
p

cres.
vio - lets blue still wait for you In the woods where the sun - beams play. And the
p
cres.
And the vio - lets blue still wait for you In woods where the sun - beams play. And the
cres.
f ten. rit. ff
vio - lets blue still wait for you In the woods where the sun - beams play.
f ten. rit. ff
vio - lets blue still wait for you In the woods where the sun - beams play.
f ten. rit. ff

SCHOOL GARDENING FOR LITTLE CHILDREN.

(*Continued from p. 87.*)

B. V.—List of Books referred to for Information and Reading.[1]

European Butterflies and Moths, W. F. Kirby, F.L.S., F.E.S.; *Text-book of Zoology treated from a Biological Standpoint* (Vol. III.), Dr. Otto Schmeil, English translation by Rudolph Rosenstock, M.A.; *Text-book of Zoology* (Science for All, Vol. III.), Nicholson; *Origin and Metamorphoses of Insects*, Lord Avebury; *The Outdoor World*, W. Furneaux, F.R.G.S.; *Thierkunde* (Vols. I. and II.), Lüben; *Die Schmetterlinge Europas*, Dr. Arnold Spuler; *Die Raupen der Schmetterlinge Europas*, Dr. Arnold Spuler; *Nature Study and Related Literature*, A. E. McGovern; *Paradise Lost* (Book VII.), Milton; *To the Butterfly*, Rogers; *To a Butterfly*, Wordsworth; *Die Metamorphose der Thiere*, Goethe.

[1] Most of the books referred to are to be found in the Library of the British Museum.

List of Books from which the Games, Stories, and Recitations have been selected.

Holiday Songs and Everyday Songs and Games, Emilie Poulsson; *Finger Plays for Nursery and Kindergarten*, Emilie Poulsson; *The Child's Song and Game Book* (Part III.), H. Keatley Moore, Mus. Bac., B.A.; *Song Stories for the Kindergarten*, M. J. Hill; *Songs for Little Children* (Vol. II.), E. Smith; *Stories in Song for Kindergarten, Home, and School*, Emerson and Brown; *Sea Shell Songs*, L. Ormiston Chant; *Child Garden* (Vols. III., V., VI.); *Parables from Nature*, M. Gatty; *In Story Land*, E. Harrison; *In the Child's World*, Emilie Poulsson; *Little Folks' Land*, N. G. Groser; *Primary Education* (Vol. XI.); *Arcadian Reciter; Rhymes and Finger Plays*, selected or written by Lucy R. Latter, for the *Everyday Life Series of Pictures*, published by W. & A. K. Johnston.

(*To be Continued.*)

Our Modern Language Section

FRENCH AND GERMAN FOR SCIENCE FACULTY.

LONDON UNIVERSITY.

IN the regulations for the examinations for the above Faculty, we find that a certain number of questions in the papers will be set so as to test the candidate's knowledge of French and German. The idea is apparently to test the candidate's ability to read Science treatises in the above languages, and in order to give some idea of the standard required, we publish below the questions that have already been given in the 1904 and 1905 examinations.

Pure Mathematics. Intermediate Science.

FRENCH.

1. Un train de Londres à Exeter part à 11 hrs. m. et parcourt en moyenne 80 kilomètres par heure; où rencontre-t-il le train qui part d'Exeter à 11·18 m. et parcourt en moyenne 48 kil. par heure; donné qu'il y a 274 kil. de Londres à Exeter?

2. Par le sommet A d'un parallèlogramme ABCD, on mène une sécante quelconque qui coupe la diagonale BD en E et les côtés BC, CD en F, G. Prouver que AE est moyenne proportionnelle entre EF et EG.

3. Une route va droit dans le sens N. 20° E. Par rapport à deux de ses bornes milliaires la position d'un clocher se trouve être, N. 20° 20′ O. et O. 42° 10′ S. Trouver à un mètre près la distance perpendiculaire de ce clocher par rapport à la route. Vérifier par une figure exacte.

4. Les hauteurs angulaires de deux montagnes AB, CD d'une pointe O sur la ligne BD sont α et β. D'une pointe O′ aussi sur la ligne BD mais plus près de B que ne l'est O par x, tous les deux montagnes out la même hauteur angulaire γ. Trouver les hauteurs verticales AB et CD, et la distance horizontale BD.

GERMAN.

5. Eine Ebne die mit zwei gegenüberliegenden Kanten eines Tetraeders parallel ist, schneidet das Tetraeder in einem Parallelogram.

6. Finden Sie die Gleichung des Kreises der durch die Punkte (0, 0) (2, 0) (0, 4) beschrieben ist; auch seinen Mittelpunkt und Radius.

Beweisen Sie dass die Länge der Sehne die der Kreis von der Linie, dessen Gleichung

$$y - 2 = m(x - 1) + 2\sqrt{1 + m^2}$$

ist, abschneidet, nicht von m abhängt.

7. Ein Mann, der mit einer Geschwindigkeit non 3½ Meilen pro Stunde an der Eisenbahn entlang spaziert, wird von einem 110 yard langen Zug eingeholt. Der ganze Zug geht in 10 Sekunden an ihm vorüber. Welche Geschwindigkeit hat der Zug? Und wenn der Mann noch in einer Entfernung von 1 Meile den Zug sehen kann, wie lange wird der Zug in Gesicht bleiben?

8. Zeigen Sie, dass mann eine gerade Linie ziehen kann, die einer jeden von zwei geraden Linien in verschiedenen Ebenen senkrecht sei; und beweisen Sie, dass diese senkrechte die kleinste Entfernung zwischen den zwischen den zwei gegebenen Linien ist.

Berechnen Sie die kleinste Entfernung zwischen zwei sich nicht schneidenden Kanten eines regelmässigen Tetraeders, wo jede Kante eine Länge a hat.

APPLIED MATHEMATICS

1. Trouver la pression moyenne exercée sur une surface plane plongée dans un liquide.

Deux liquides de densités différentes reposent en équilibre stable, l'un sur l'autre, dans un vase en forme de parallélipipède rectangle. Prouver que la pression moyenne sur l'une des parois du vase est plus petite dans ce cas que si les liquides étaient intimément mélangés.

2. Lorsqu'un corps pesant, suspendu par un fil a un point fixe, est écarté de sa position d'équilibre, le pesanteur tend a l'y ramener et lui fait exécuter, autour de la verticale, des oscillations qui se perpétueraient indéfiniment la résistance du milieu ambiant.

Galilée a établi et énoncé, vers 1629, les deux lois fondamentales du mouvement d'un pareil système: l'isochronisme des petites oscillations, et la relation qui lie la durée de ces oscillations à la racine carrée de la longueur de la suspension, lois ne s'appliquent rigoureusement qu'au pendule idéal, formé d'un point matériel pesant, suspendu par un fil sans masse, rigide et inextensible, à un axe fixe, et exécutant, dans la vide, des oscillations planes, infiniment petites.

Translate, and give a theoretic explanation of the two laws of Galileo.

3. Es soll die Schwingungsdauer eines Kegelpendels als Funktion der Länge l und des Neigungswinkels α bestimmt werden.

Es soll ferner gezeigt werden, dass, wenn der Aufhängepunkt einen horizontalen Kreis vom Radius a mit der constanten Winkelgeschwindigkeit ω beschreibt, die Pendelkugel auch einen horizontalen Kreis beschreiben kann. Es sollen auch Gleichungen aufgesucht werden, welche den Radius dieses Kreises bestimmen.

4. Bewegt sich ein Körper gleichförmiger Geschwindigkeit geradlinig vorwärts, so sagen wir, er sei frei von allen Kräften, hingegen er sei von Kräften beenflusst, wenn die geradlinige, gleichförmige Bewegung gestört wird.

Translate this passage and elucidate its meaning more fully in English.

Chemistry.

FRENCH.

1. Describe shortly the chemistry in the process alluded to in the following sentence:—

"L'acétate du plomb basique traité par l'acide carbonique perd une partie de son oxyde pour former du carbonate de plomb et est ramené à l'état d'acétate neutre. Celui-ci par l'addition d'une nouvelle quantité d'oxyde de plomb repasse à l'état d'acétate basique."

2. Translate and explain the following, and give instances of compounds with their formulæ illustrating the statements made:—

"Le cuivre donne deux séries de composés, les sels cuivreux et les sels cuivriques. Les sels cuivriques sont les plus stables ils ressemblent aux autres dérivés des métaux bivalents. Les composés cuivreux ne sont guère stables; à l'air ils tendent à se transformer en composés cuivriques; ils offrent quelque analogie avec les dérivés mercureux qui ont les mèmes formules."

3. Translate the following into good English, giving some examples to show exactly what is meant:—

"Les corps simples se combinent les uns avec les autres en proportions définies. C'est là une des vérités les mieux établies de la philosophie naturelle. Elle comprend les deux faits suivants. Premièrement, les rapports pondéraux suivant lesquels les corps se combinent sont fixes, pour chaque combinaison; en second

lieu, les nombres qui expriment ces rapports sont proportionnels entre eux pour les combinaisons les plus diverses."

GERMAN.

4. Illustrate by examples and explain the general principle involved in the following statement:—"Alle Körper vereinigen sich in bestimmten unveränderlichen Gewichtsverhältnissen zu chemischen Verbindungen."

5. Zwei Elemente können sich unter ungleichen Umständen in mehr als einem Gewichtsverhältnisse zu natürlich verschiedenen Verbindungen vereinigen. Betrachtet man aber diese Verschiedenen Gewichtsverhältnisse näher so findet man stets dass sie einfache Multipla des kleinsten Gewichtsverhältnisses darstellen." Translate and explain the foregoing statement, and give some instances which illustrate your explanation.

6. Translate into good English the following, adding any equations and notes necessary to make its meaning clear:—

"Dieses jetzt viel gebrauchte Salz entsteht, wenn man in eine concentrirte Lösung von kohlensaurem Natron Kohlensäure einleitet oder eine trockne Mischung aus 1 Theil krystallisirtem und 3 Theilen calcinirtem kohlensauren Natron mit überschüssiger Kohlensäure zusammenbringt. Man erhält es im ersteren Falle als ein krystallinisches Pulver, im letzteren als eine weisse zusammengesinterte Salzmasse. Es ist schwerer löslich in Wasser als das einfach kohlensaure Natron, entwickelt aber mit Säuren die doppelte Menge von Kohlensäure."

Experimental Physics.

1. Compare the unit proposed in the following paragraph with those now in use:—

La commission des constantes, institutée par la société française de Physique, s'est déjà ralliée à une proposition tendant à adopter la pression exercée par une colonne de mercure de soixante quinze centimètres a 0° dans les conditions normales de la pesanteur, et a donné à cette unité le nom de barye.

2. La différence de potential entre les deux pôles d'une pile, même assez puissante, est en général beaucoup trop faible pour qu'on puisse obtenir des étincelles en rapprochant l'un de l'autre les deux rhéophores de la pile, même jusqu' à une très petite distance; mais il s'en produit toujours une, à la vérité très petite, quand, après les avoir réunis, on vient à les séparer. Si alors on les maintient à une petite distance, et que la force électromotrice de la pile soit suffisante, l'étincelle se transforme en une lumière continue que l'on nomme l'arc voltaïque, et qui se montre avec un grand éclat entre deux électrodes de charbon.

Translate and give an explanation of the phenomenon.

3. Explain the following:—

Die Tangente des Abstandes des scheinbaren Ortes eines Sternes von dem wahren Orte, oder des Winkels, um welchen die scheinbare Bahn des Lichtes gegen die wirkliche geneigt ist, ist gleich dem Verhältnis der zur Richtung des Lichtstrahles senkrechten Bewegung der Erde zur Geschwindigkeit, mit welcher sich das Licht, fortpflanzt.

4. Gleiche Quantitäten entgegengesetzter Elektricitäten neutralisiren sich also vollständig bei ihrer Vereinigung. Hat man ein Elektroskop durch Berührung seines Knopfes mit einer geriebenen Glas-oder Siegellackstange geladen und bringt an den Knopf desselben irgend einen anderen, mit einem beliebigen Stoff geriebenen Körper, so divergiren entsprechend die Goldblättchen des Elektroskops stärker, wenn die Elektrisirung des Körpers mit der des Elektroskops gleichnamig ist, sie fallen zusammen, wenn sie ungleichnamig ist. Auf diese Weise kann mann die Art der Elektricitätserregung bei der Reibung der verschiedensten Körper an einander studiren.

Translate and explain how you would carry out the experiments here suggested.

Botany.

1. L'effet le plus manifeste de la respiration diurne est de fixer dans le végétal une quantité additionnelle de carbone et de lui enlever de l'oxygène. Après avoir mis ce fait hors de doute, on l'expliquait par une simple décomposition de l'acide carbonique dont l'oxygène serait mis en liberté et dont le carbone s'unirait directement à l'eau, si abondante dans les organes du végétal, pour produire ces combinaisons neutres, que nous avons vues former en frame et la plus grande proportion des principes organiques qui y séjournent ou y circulent. Cependant, comme l'eau se décompose beaucoup plus facilement que l'acide carbonique, on serait aujourd'hui porté à admettre que c'est elle qui cède son hydrogène à l'acide pour former les combinaisons neutres, et abandonne son oxygène. (Jussieu).

Translate the above passage. What did the author refer to as "la respiration diurne"?

2. Das Abwerfen der Blätter bei laubwerfenden Holzgewächsen vollzieht sich mit Hilfe einer Trennungsschicht, die an der Blattbasis ausgebildet wird. Die Abtrennungsfläche zeichnet sich am Spross als Blattnarbe. Demgemäss sieht man an entlaubten Holzgewächsen im Wintet die Achselknospen über den Blattnarben stehen. (Strasburger).

Translate the above passage, giving examples of the facts referred to.

FRENCH GIRLS' SECONDARY SCHOOLS.

II.

THE programme of subjects taught in the girls' Lycées is as follows:—

1. L'enseignement moral.
2. La langue française, la lecture à haute voix, et au moins une langue vivante.
3. Les littératures anciennes et modernes.
4. La géographie et la cosmographie.
5. L'histoire nationale et un aperçu de l'histoire générale.
6. L'arithmétique, les éléments de la géométrie, de la chimie, de la physique et de l'histoire naturelle.
7. L'hygiène.
8. L'économie domestique.
9. Les travaux a l'aiguille.
10. Des notiens de droit usuel.
11. Le dessin.
12. La musique.
13. La gymnastique.

Of course the subjects included in this programme are not all taught throughout the school course. Certain of the subjects (*e.g. droit usuel*) are only taken by the pupil for one year; but the ordinary child, who has passed through the Lycée from the ages of eleven to seventeen, will have attended classes in all the subjects. We cannot wonder that the teachers complain that the syllabus is too full. Certainly the "cramming" of an English student for an examination like the London Matriculation (old style) is nothing to the *chauffage* of a French aspirant to the training schools of Sèvres or Fontenay-aux-Roses. Still, no one can deny that our neighbours have chosen a liberal programme for their girls. It is encyclopædistic enough to reach the ideal of a Comenius or a Milton. Those who attack the programme argue, truly enough, that a woman of forty has forgotten nearly all these things that she learned at school. Marcel Prévost, the novelist, as an advocate for Molière's *clarté de tous*, proposes reducing all things necessary to culture to a compact form—one imagines a sort of intellectual "boom-food"!—and insisting on a complete knowledge thereof. We can only answer that compressed tablets of knowledge are morally indigestible, and that no normal modern child will assimilate them. Further, that the cultured man is *not* the man who *knows*, but rather the man who *has known*, the man who knows where to look for his facts.

Considering some of the subjects of the syllabus separately, the subject *morale* is no doubt the most foreign to our English ideas. It is specially interesting as the first substitute attempted by a modern nation

for the "definite religious instruction" of which we hear so much nowadays. At present, in England, we are as accustomed to school prayers as we are to any other item of the school routine, and we are inclined perhaps to make sport of *morale*; but as—

> "Golden lads and lasses must,
> As chimney-sweepers, come to dust,"

there may well be a course of *morale* lying in wait for our schools of the future. Certainly the French have, once and for all, refused to abandon the schoolroom to the use or abuse of polemical religious teaching. Considering the thoroughness with which subjects are taught in a French school, *morale* will doubtless have a far-reaching influence on the mothers of to-morrow, and through them on the France of the future. Who can say what that influence will be? There can be no doubt that the clerical party have often made an unscrupulous use of "religious instruction" to inculcate dogmatic prejudice or fictitious history. A glance at some of the old catechisms will convince any one who doubts this statement.[1] But as a classroom subject it seems to us that this "morality *un*touched by emotion" has yet to win its spurs.

With regard to method, in the secondary schools the subject begins in the third year (minimum age fourteen). The subjects treated are the family, society, charity, the Fatherland; *devoirs personnels* and *devoirs religieux*. General ideas are given on these subjects, and the method adopted is generally the lecture system. A short dictated *résumé* follows or precedes the teacher's lecture. In the hands of a good teacher the class supplies illustrative examples, and even asks questions *en route*. In the fourth year we have lectures on the general ideas of the great philosophers, ancient and modern, with critical reading of chosen passages from their great works. Thus the pupils read scraps of Plato, Aristotle, Epictetus, Marcus Aurelius, Montaigne, Pascal, Bossuet, and (after a special treatment of philosophy of the eighteenth century) of Kant. In the fifth year the course becomes one of psychology applied to *morale* and education. The official note on the teaching of the subject points out that it is to be treated neither from a purely scientific nor from a purely metaphysical standpoint, but as *une étude de la vie de l'âme*. The course is similar to a first term's course of psychology in a training college at home. In a representative lesson, which the writer attended in the excellent Lycée of Mâcon, on "Sensation," the teacher, after touching on the difference between "sensation" and "perception," went on to an analysis of the simple senses. The main thread of the argument was carried on by the teacher with admirable clearness, but the pupils were fully "alive" throughout the lesson, and contributed something towards the working out. Thus it was suggested that the rival parties in the phonetic controversy are perhaps *audiles* and *visuels* respectively. Again, to illustrate the fact that there are different types of *audiles*, the lack of the power of appreciating music shown by Hugo and Balzac were cited.

Next to the mother tongue, most time is given to modern languages. Latin is a "facultative" subject for one hour a week in the fourth and fifth years only, though this seems absurd when one considers both the Latin origins of the mother tongue, and also the time spent on historical grammar and the study of derivation of words from Latin roots, yet there is a great gain of time for *les langues vivantes*. During most of the school course one-fifth of the time is given to English or German (alternative). Spanish and Italian are taught in Southern schools. Foreign languages are always taught by French teachers who have acquired the requisite language abroad and speak it fluently. The system seems to have good results in most cases. It is certainly preferable to the (old) English system of importing foreigners who did not understand enough of the native tongue for purposes of class discipline. We think, however, there are two drawbacks to the French plan. First, the "dyeing" system which a teacher undergoes in England or Germany is apt to wear off, unless he can afford to go back often. Secondly, the teacher's habits, dress, customs, personality, and *sympathies* are not those of the country which he represents to the class. It is perhaps partly as the result of this that one comes across weird traditions concerning the doings of the people in the "small island off the coast of France." Whole blocks of little French children apparently believe that the invariable English breakfast is porridge and bacon, and that Sunday *chez vous* is one long psalm-singing. Who will show us a more excellent way—the ideal system of a fully qualified native teacher who has a sound knowledge of the language of the country where he is to teach? In the "oral" system such a teacher will have an immense advantage over the other. He would also understand better his pupils' difficulties than the native-bred teacher.

As to methods, in the *classe enfantine*, the lowest class (our kindergarten), the exercises are exclusively oral, and great attention is given to pronunciation. Object lessons are utilised to teach the names of ordinary objects, and the child learns the names of the numbers and some baby-songs. In the lowest class of the preparatory schools (age nine years) grammar is begun, with little exercises and *dictées*. The oral work is continued. In German there are easy graduated exercises in writing the characters. There is a little reading, chiefly pronunciation, and some easy oral translation. The same programme is continued throughout the preparatory school (to the age of twelve), with more written work, songs, and recitations. In some cases the "Redaction" book is used for the lower forms of the Lycées proper, with excellent results. The system of "redaction" is much employed for teaching composition in preparatory schools. Each pupil has a book consisting of pictures only. Thus on each page there are six little pictures showing the stages of a shipwreck, the shoeing of a horse, the story of "Meddlesome Matty." The class builds up the story from the pictures. In the teaching of modern languages this method is employed at a much later stage, when the children can express themselves in the foreign language, and it has the great merit of being direct. A varied assortment of pictures (provided each child has one) is an immense aid to the language teacher. The children need buy no new book, for they can use the same book they used for "redaction" at seven years old. Thus with little pictures of a post-office the children can at one lesson learn words connected with

[1] *Q.* "Qui était Luther? *A.* Luther était un religieux augustin qui épousa une religieux et se mit a déclamer contre l'Eglise catholique. Il continua de prêcher l'erreur, et, après avoir mené une vie scandaleuse, il mourut en sortant d'un repas ou il s'était, suivant sa contume, gorgé de vin et de viande."—*Catéchisme de Persévérance*, p. 386.

post-office business. At the following lesson the class can be turned into a post-office, and the children can use their new words and phrases. In the first year of the Lycée proper there is revision, some syntax, reading, and talks on the subjects read. The following new subjects introduced are the geography of the country of the language studied, money, weights and measures, and short compositions in the language are attempted. Books read are Ruskin's "King of the Golden River," the "Water Babies," and "Robinson Crusoe." In the next year the same programme is continued, but general notions of the history of the country replaces geography. Lamb's "Tales," Macaulay's "Essays," and "Evangeline" are among the books read. In the fourth year the great epochs of the literature of the foreign country in question are studied, and the pupils are given general notions of the works of Chaucer, Shakespeare, and Milton.

In the fifth year the programme widens considerably. There is the excellent idea of one hour a week given to the reading of foreign literature. Dante, Cervantes, Shakespeare, Goethe are representative authors read, with necessary explanations by the professor. Another interesting item of the programme is "the influence of French literature in England and Germany." There is a good deal of written work, and compositions on subjects of general and literary interest. The girls seem able to take excellent notes (in English) of an English lecture. In some cases an English assistant has recently been added to the staff. Her mission is to talk English with small groups of advanced pupils for not more than ten hours a week in return for board and lodging. The idea is a good one, and in some cases clubs and even English games have been started by the assistant, who is regarded as the colleague of the *professeur*. The results of the French modern language system are best seen in the middle forms, where one finds quite young children who can understand, and to some extent speak, the language. The older girls have, for the most part, not had the advantages of the "direct" method from the first.

BRITISH ASSOCIATION MEETING IN SOUTH AFRICA.

THE official party of two hundred members of the British Association arrived at Cape Town on August 15, and in the evening, in the presence of a large and brilliant gathering in the handsome new City Hall, Professor G. H. Darwin delivered the first part of his presidential address, the second part of which is to be given at Johannesburg on the 30th inst.

Illustrating the augmentation of man's power over the forces of Nature during the past four centuries, Professor Darwin recalled the fact that Bartholomew Diaz, the discoverer of the Cape of Storms, spent sixteen months on his voyage; while a ship of 13,000 tons had just brought his hearers there, in safety and luxury, in little more than a fortnight. The courage, the persistence, and the endurance of the early navigators is no longer demanded of us, yet the thought that to-day is less romantic and less heroic than yesterday has its consolation, for it means that the lot of man is easier than it was, due to the heritage of knowledge handed down by our predecessors, whereby we have been born to the accumulated endowment of centuries of genius and labour.

It must always be profoundly interesting to the mind of man to trace successive cause and effect in the chain of events which make up the history of the earth, and to speculate on the origin and future fate of animals, and of planets, suns, and stars. This choice of a subject had been almost forced upon him by the scope of his own scientific work, and was, he thought, justified by the name he bore. The man who propounded a theory of evolution was attempting to reconstruct past history by means of the circumstantial evidence afforded by the present.

The test of a scientific theory lies in the number of facts which it groups into a connected whole; it ought besides to be fruitful in pointing the way to the discovery and co-ordination of new and previously unsuspected facts. Until recently theories of evolution were partial and discontinuous. Then came the theory of natural selection, which, by formulating the cause of the divergence of forms in the organic world from the parental stock, furnished the naturalist with a clue by which he examined the disordered mass of facts before him, and was enabled to deduce order where chaos had ruled before; but the problem of reducing the heap to perfect order would probably baffle the ingenuity of the investigator for ever.

Theories necessarily undergo modification from time to time, but it was justifiable to maintain that the general principle held its place firmly as a permanent acquisition to modes of thought. Evolutionary doctrines concerning inanimate nature had been profoundly affected by this great impulse, and the origin and history of the chemical elements, and of stellar systems, now occupied a far larger space in the scientific mind than was formerly the case. The mystery of life remained as impenetrable as ever.

The President's point of view was illustrated by a reference to political history. The degree of persistence or permanence of a species, of a configuration of matter, or of a State, depended on the perfection of its adaptation to its surrounding conditions. The history of a State generally showed the degree of its stability gradually changing, slowly rising to a maximum, and then slowly declining. When it fell to nothing a revolution ensued, and a new form of government was established. Judging by analogy, the biologist should expect slight continuous changes occurring during a long period of time, followed by a somewhat sudden transformation into a new species, or by rapid extinction.

Messrs. Crosby Lockwood & Son will publish in September an entirely new edition of De Fivas' *Grammar of French Grammars*, to which a new feature has been added by the insertion of more than 250 "Graduated French Texts," being selections from authors of repute of the most varied styles, each of the original grammatical Exercises being now preceded by an appropriate "Text," for use in reading and translation, and for the assistance of students in translating the Exercises. The new matter thus added amounts to an enlargement of the work by nearly 80 pages. The text of the Grammar and Exercises has also been revised throughout.

OUR TUTORIAL SECTION

OUR PUPIL TEACHERS' AND SCHOLARSHIP COURSE.

BY ARTHUR T. FLUX,

Late Principal of the Belvedere Pupil Teacher Centre, First on Scholarship List; Author of "Scholarship School Management," "Building of the British Empire," etc.

SCHOLARSHIP COURSE FOR 1905 AND 1906.

Ninth Month—September.

Work to be Prepared.

1. *Reading and Repetition.*—These subjects must not be neglected. Systematic practice must be taken if high marks are to be secured.

2. *Teaching.—The Teaching of Geography.* This is perhaps the most popular of all school subjects, especially if it is handled in the right way. Not only is it most interesting from the facts it teaches, but it also provides many opportunities for mental training, not of the memory alone, but also of reasoning and judgment. In recent years the teaching of geography has materially improved—and deteriorated. In the old days, the lesson generally consisted of committing to memory lists of names, &c., with little attempt at explanation or connection; now, much greater stress is laid on reasons and on connecting one set of facts with another. In the former case facts were learnt very definitely, in the latter there is a tendency to haziness arising from the cessation to a great extent of the memory work. To be entirely successful, the teacher must combine the two methods, the teaching must be interesting, facts must be explained in reference to others, and at the same time there must be a large amount of memorising. The area, population, capes, bays, rivers, mountains, lakes, etc., are best learnt by mapping. When starting a new country, its position with regard to England and other countries should be fixed. A large outline map should be drawn, and in this map should be inserted all names to be remembered and no others. A child will gaze at a map full of details for the whole of the school year and then know nothing about it. The outline should be copied by the class, and as the lessons proceed each child should build up the country and its details. This should be repeated until a fair map can be drawn from memory. In teaching the coast line, take imaginary coasting voyages and fill in capes, bays, islands, river mouths, &c., with explanation and comment. But a certain time at the end of the lesson should always be devoted to committing to memory the details which have been discussed. In dealing with the relief, the skilful teacher will use a few pounds of clay or plasticene and mould the country as the lesson proceeds. The climate must be taught in connection with latitude, altitude, proximity to sea, general direction of mountain chains, prevailing winds and ocean currents, and the productions (animal and vegetable) connected with the climate. Constant comparison should be made with England. The imports and exports must be connected with the climate and productions, the towns with the circumstances which had led to their being situated where they are. Many excellent series of Geographical Reading-Books are published which materially assist the teacher, but it must always be remembered that there must be a certain amount of memorising, without which the lesson cannot be a success.

3. *Drawing.*—Two copies each week drawn under examination conditions as to time.

4. *Music.*—Diatonic and chromatic intervals. The intervals usually present some amount of difficulty although they are really very simple. The intervals occurring between any two notes of the major scale are diatonic, and may be divided into two classes, major or minor (fourths are perfect and augmented, fifths perfect and diminished). An interval larger than the major is augmented, smaller than the minor diminished. The table of intervals previously given will apply equally to the Tonic Sol-fa Notation.

The following are questions which have been asked.

(1) Name the following intervals:—

doh—lah, me—te, fah—me$_1$, ray—fah, soh—doh.
ray—te, fah—lah, me—doh^1, soh—ray^1, te$_1$—lah.
me—doh, fah—soh, ray—lah, doh—te, te$_1$—me, &c.

(2) State between which tones of the following extended scale are there (*a*) major thirds, (*b*) minor thirds:—

d r m f s l t d^1 r^1

(3) Between which tones of the common scale are there (*a*) minor sixths, (*b*) minor sevenths?

(4) Between which tones of the common scale are there (*a*) minor seconds, (*b*) pluperfect fourths, (*c*) perfect fifths?

(5) What is the difference between a major and minor interval of the same numerical name, and between a diminished and augmented fifth? Give an example from ditto.

(6) Write a minor seventh upon **fah, ray, te,** and a major sixth above **soh** and **lah.**

(7) Write a perfect fifth above **me** and **te,** and an augmented fourth above **soh, fah, ray.**

(8) Name the inversion of the following intervals:—Perfect fourth, minor seventh, minor third, augmented (pluperfect) fifth, major sixth.

(9) Name the intervals:—

(*a*) **fe—de$_1$** (*b*) **r—le** (*c*) **t$_1$—la**
(*d*) **la$_1$—fe** (*e*) **me—ta** (*f*) **se—fa,** &c.

(10) Name the intervals formed between each of the following notes with each of the others:—

r bah se lah.

(11) Write above each of the following notes a diminished (imperfect) fifth:—

ray, se, me, lah$_1$, fe.

(12) Name the following intervals:—

m—s, t$_1$—f, r—t, m—l, f—se d—se, re—s, f—t.

5. *Penmanship.*—Write a page daily in the *Practical Teacher Copy Book*, and take great care at all times. Many marks are carelessly thrown away in this exercise through not attending to a few simple rules.

6. *Composition.*—Write one or two essays each week on such subjects as:—

(*a*) Printing.
(*b*) How far is success a sign of merit?
(*c*) The darkest day—wait till to-morrow will have passed away.
(*d*) Social condition of the people in Plantagenet times.
(*e*) Professionalism in athletic sports.
(*f*) Describe any incident which you have either witnessed or read about.
(*g*) *Abeunt studia in mores.*
(*h*) Revenge is a kind of wild justice.

Read up the subject if you are not sufficiently well acquainted with it. In any case think it well over, arrange your ideas in definite order, and jot down a skeleton outline before commencing to write. The essay must be divided into paragraphs, each dealing with one set of ideas. Revise carefully, and improve any weak sentence or expression.

The following notes may indicate how the subjects can be treated:—

(*a*) Printing. Note that writing is comparatively modern compared with speech. The desire to render ideas permanent led to carvings, hieroglyphics, and finally an alphabet. Making copies by writing a tedious process—the copy naturally expensive. Point out briefly how invented, and some of the chief improvements, *e.g.* rotary machines for the old press. Then proceed to estimate the value of printing to mankind. Imagine the world without it and see what would be lost.

(*b*) Success is not always a sign of merit, nor is non-success a sign of unworthiness. Much depends upon the meaning of success. What we consider success is sometimes failure, and *vice versa*. To an outsider the result of the three years' ministry of the Greatest Teacher was apparently an utter failure, in reality it was not so. Taken as a general rule it may be affirmed that the deserving man generally succeeds, and the undeserving properly fails, but this is not by any means an infallible rule.

(*c*) We are creatures of feeling, and our outlook upon the world is coloured by our own state of health or mind. The old Stoics strove in vain to master this waywardness—read the *Meditations* of Marcus Aurelius—but very few if any succeeded in reaching a state of mind in which the outside world was powerless to influence. A person of low intelligence is affected less than one who is highly imaginative and sensitive. An unkind word, an adverse criticism, an apparent slight is sufficient to cause days of gloom and misery. But the statement above is true. Time is a wonderful healer, and a man may be roused from the depths of despair to the heights of ecstasy in a very short time.

(*d*) The knowledge of history will supply all that is necessary for this. Everything was rough and coarse compared with modern life. The "good old days" were generally pretty bad.

(*e*) Whether professionalism in sports is a good thing nationally is a much-debated question. Sport should be sport *per se*, and when money considerations enter into the question it can hardly be sport. A team of footballers have high wages for what they do, are simply engaged in business, not sport, and money bribes weigh more with many than the honour which should accrue to them. Professionalism sets a high standard of excellence, but unfortunately the example is little followed. The thousands who flock to watch a match would be doing better if they were engaged in sport themselves, no matter how poor their efforts.

(*f*) This is an exercise in word painting which gives the student an absolutely free hand.

(*g*) *Abeunt studia in mores*—studies go to form character—you can tell what a man has read by what he is. A statement true to some extent only. Doubtless the growing character is influenced by what is studied, but is not entirely settled by it. A man may spend half a lifetime in studying the Bible, and then be far from being a good man. Occupations and general surroundings cultivate types of character and feature which may be pointed out.

(*h*) Bacon's epigram is quite true. Revenge is an attempt to repay some injury by a return of the same kind—the taking of punishment into one's own hands. It is wild because the person aggrieved is never in a fit state of mind to estimate the amount of punishment due, and there is an inevitable tendency to give more than one gets.

7. *English.*—(1) Learn 15 roots and meanings per week.

(2) Words derived from the names of persons and places.

(3) *Henry V.*, Act IV., Scenes 2–5.

(4) Prepare a good life and character of Bacon, with some knowledge of his other works.

(5) Prosody. The laws of metre and verse.

Notes.—(1) The etymology must on no account be neglected. The student should at least know all the derivations given in the *Pupil Teachers' Note-Book*.

(2) There is little in the scenes set this month for special mention. The empty boasting of the French is emphasised for a palpable purpose. The dialogue between Westmoreland and the King (especially the speech of the latter) is one of the finest passages in the play.

(3) Bacon's *Essays* can hardly be understood properly without some knowledge of his life and his life-work. The text-book will provide useful summaries, but a more extensive life should be read. There are many incidents in his career which show that he was unscrupulous in his determination to advance his position in the political world, and which are not at all to his credit. But when we turn to his writings, we can have little but admiration. In the *Novum Organum* he introduced an entirely new aspect to the world of science. Systems of natural philosophy before his time had been deductive. Laws were stated at random, and then every attempt was made to make facts fit in with them, *e.g.* the world was the centre of the solar system; hence starting from this assumption it became necessary to evolve all sorts of excuses and reasons for the varying motions of the sun, moon, stars, planets, &c. Bacon introduced the inductive method, viz. collect as many examples as possible, examine them carefully, and *then* induce the rule. This is the method now universally adopted. Bacon discovered nothing himself, but he indicated the road to success to all who followed him.

(4) The various kinds of metre and verse must be studied carefully, so that the student can scan and name any line set before him. Usually this is easy, but sometimes the monotony of the metre is varied by the introduction of a foot of a different kind. The play is written in blank verse, that is, iambic pentameters unrhymed, but Shakespeare continually varies the metre.

For who | is he | whose chin | is but | enrich'd |

This is a perfect iambic pentameter.

With one | appear | ing hair | that will | not fall | ow.

This line is hypermetric—one syllable in excess of the proper number.

Suppose | the ambass | ador | from the French | comes back, and so on.

In this line two of the iambics are replaced by anapæsts.

Prepare answers to the following questions:—

(1) "Orthography is always in the rear of pronunciation." Discuss the chief causes to which this is due, and give illustrations.

(2) Distinguish between genuine—authentic; ingenious—ingenuous; divers—diverse; politic—political; precedence—precedent.

(3) Classify and illustrate the uses of the infinitive mood.

(4) Explain the difference in use, as relative pronouns, between (*a*) *who* and *that;* (*b*) *what* and *which*. Illustrate your answer.

(5) Define "case." What case inflexions remain in modern English? How is the want of others supplied?

(6) Trace the origin of the modern meaning of any *five* of the following words or phrases:—Shibboleth, boycott, talented, blackguard, nice, pundit, lackadaisical, to show the white feather, to mind one's P's and Q's.

(7) Explain with examples:—Euphemism, epigram, dilemma.

Show by two different sentences the difference between a simile and a metaphor.

8. *Geography.*—(*a*) Australia—Imports, exports, towns and Government.

(*b*) Revise Central America.

Prepare the geography of Australia thoroughly. Note particularly the imports and exports. A short history of the development of the States should be committed to memory, and also some account of the history of Australian exploration.

The Government must also be noted. The Commonwealth consists of six States—Victoria, New South Wales, Queensland, South Australia, West Australia, and Tasmania. Each State has a Parliament of its own for local affairs, and sends representatives to the Commonwealth Parliament—(*a*) To the House of Commons, in proportion to population; (*b*) to the Senate, each the same number. The chief difference between the Commonwealth Government and that of the Dominion of Canada is that in the latter case the Central Government decides what the separate States are to control, whereas in the former the individual States determine what shall go to the Central Parliament.

9. *History.*—Henry V. and Henry VI.

Henry V.

The Lollards. Continued persecution, execution of Oldcastle in 1417.

The Renewal of French War.

Henry revived Edward's absurd claim. The nobles were tired of peace, the merchants wanted new markets, and the rate of pay of common men-at-arms was three times that of a labourer, so the war was very popular.

Henry landed and besieged Harfleur, but after his army was thinned by sickness he endeavoured to make for Calais, crossed the Somme, beat the French at Agincourt (which must be carefully read up). In 1420 Henry again crossed the Channel, and after ravaging Normandy the

Treaty of Troyes was signed, which provided that Henry should marry Catherine and become King on the death of Charles.

His early death from dysentery prevented this. His widow married Owen Tudor, from whom was descended Henry VII.

Henry VI.

Minority.

Bedford, Protector of the Realm and Regent of France.
Gloucester, Regent in England in Bedford's absence.

War in France.

The Dauphin never agreed to the Treaty of Troyes, and as Charles died shortly after Henry V., he at once became king of what part of France he could, and commenced hostilities. The English were assisted largely by the Duke of Burgundy.

1423. Battle of Crevaut.
1424. Battle of Verneuil.
1428. Battle of Herrings.
} In all of which the English were successful.

Siege of Orleans raised by Joan of Arc, from which time the English power rapidly declined. After conducting Charles to Rheims she was, in 1431, taken and burnt by the English.

A quarrel with the Duke of Burgundy and the death of Bedford further weakened the English cause, and notwithstanding the heroic attempts of Talbot in 1453, nothing remained but Calais.

Jack Cade's Rebellion.—Social and political discontent.

Home Affairs.

This was a period of aristocratic factions and generally weak rule. Gloucester, the popular leader, was opposed to Beaufort, Bishop of Winchester, the head of the Court party.

1422. Henry came of age, and ruled with the advice of Beaufort, whose influence superseded Gloucester's. The latter died in 1447, and shortly after Beaufort followed him. Suffolk, who had risen into importance after the King's marriage with Margaret of Anjou, was held responsible for the loss of the French provinces, was banished and murdered at sea. The rival leaders then were Richard, Duke of York, and Somerset. In 1453 Henry went mad, and York was appointed Protector, and Somerset was imprisoned. The next year the King recovered, York was dismissed and Somerset released. The Duke of York then raised an army and marched on London, and the Wars of the Roses commenced.

Wars of the Roses.

Causes:—

1. The jealousy of the great barons, and the indecent scramble for power.
2. The weak rule of Henry VI.
3. The antipathy to Margaret of Anjou.
4. The existence of a powerful leader—Richard, Duke of York, who thought he had a better right to the throne than the King himself.

The Yorkshire Claim:—

A genealogical table, showing the descent of the Yorkist and Lancastrian families, must be prepared and carefully learnt.

Briefly, Richard, Duke of York, was, through his father, descended from Edmund, fifth son of Edward II.; through his mother, from Lionel, Duke of Clarence, third son of Edward III.; while Henry VI. was descended from John of Gaunt, fourth son of Edward III. The Duke of York was thus, on one side, of an older branch than the King. He was also allied, by marriage, with the Nevilles, who were most powerful.

Battles:—

1455. St Alban's. Yorkists victorious.
1459. Blorecheath. Yorkists victorious.
1460. Northampton. Yorkists victorious.
1460. Wakefield. Lancastrians victorious. Duke of York killed.
1461. Mortimer's Cross. Yorkists victorious.
1461. St Alban's. Lancastrians victorious.
1461. Towton. Yorkists victorious.
1464. Hedgeley Moor and Hexham. Yorkists victorious.
1471. Barnet. Yorkists victorious.
1471. Tewkesbury. Yorkists victorious.

Note the following:—

The Wars of the Roses, their character and results:—

It is a common mistake to suppose that the whole of the nation was involved in these sanguinary contests; this is not so. The war was carried on by the great barons and their armed retainers, and the general commons of the country pursued their usual avocations with less interruption, perhaps, than would have been received in time of peace. The results briefly were:—

(*a*) The final extinction of the feudal system. The loss of life among the barons and their retainers was enormous, and practically exterminated the powerful houses, which had kept up semi-regal state. One feature of the struggle, which is most terrible, is the ferocity with which both parties took revenge for the deaths of kinsfolk. This introduction of personal feuds into a political contest accounts for the fierce contests and great loss of life. Those barons who still remained were so impoverished that they were glad to sell their estates and settle down as country gentry. Some even had to fly the country, and gained precarious livings by any menial work.

(*b*) The growth of commercial prosperity and enterprise. The great towns did well out of the contest, by obtaining concessions from both parties.

(*c*) The rise of a new nobility. Henry VII., on his accession, was able to rule quite absolutely. There were no great barons to hold him in check, and he took care that they did not regain their lost power. The new men were personal friends, who dared not oppose him.

This period is the closing scene of the "Middle Ages," or "Dark Ages," when brute strength was the only law of right. Henceforth a new era. Modern history starts, when intellectual and mental ability were placed before rude strength and savagery.

Edward V. and Richard III., 1483–1485.

Richard's means of obtaining and securing the throne; Buckingham's rebellion; abolition of Benevolences; Earl of Richmond's invasion and Battle of Bosworth. Note that Richard III. was a most able ruler and soldier, and probably, had the throne come to him in a quiet and legitimate way, would have made a great king. He certainly was not the fiend portrayed by Shakespeare.

Learn the following note:—

Advances of the Constitution under the Lancastrians and Yorkists. As the house of Lancaster reigned solely by the choice of the people and sanction of Parliament, they seldom, if ever, ventured openly to resist the powers of the Commons, who took advantage of the circumstances to make many advances, the chief of which were:—

(1) They maintained and completely established their exclusive right of taxation.

(2) They controlled public expenditure, voted their supplies for special purposes, and saw that they were properly spent.

(3) They made supplies depend upon redress of grievances.

(4) They controlled the King's household expenditure.

(5) They established more fully the fact that laws can only be made by the consent of King, Lords, and Commons.

(6) They began to give advice on matters of foreign policy.

(7) They maintained the right to impeach bad ministers, to freedom of speech, and freedom from arrest.

10. *Arithmetic.*—Stocks and Shares. Read carefully what is said in the text-book (Christian and Collar), and work as many of the examples as possible. "Brokerage" will not be required in the examination.

Work the following general test paper:—

(1) A farmer paid £780 for cows and sheep; of this sum he paid £350 for 25 cows; if a cow cost 7 times as much as a sheep, how many sheep can he buy? Ans. 215.

(2) By what fraction must the difference between $\frac{1}{3}$ of $4\frac{1}{2}$ and $\frac{1}{5}$ of $9\frac{1}{6}$ be multiplied to make it equal to $\frac{1}{7}$ of $4\frac{1}{2}$? Ans. $\frac{35}{197}$.

(3) If the cost of building a wall 227 yards 1 foot long and 1 foot 8 inches thick is £28, 8s. 4d., what will be the cost of building a wall the same height, 468 yards 2 feet long and 1 foot $1\frac{1}{2}$ inches thick? Ans. £39, 10s. $10\frac{1}{2}$d.

(4) If A's rate of profits is $\frac{1}{3}$ of B's, and for every guinea that B gains C gains a sovereign, compare the profits of A and C. Ans. £7, 15s.

(5) Find the difference between the simple and compound interest on £1000 for 3 years at 5%. Ans. £7, 12s. 6d.

(6) The section of a telegraph cable is half an inch in diameter, the central wire is $\frac{1}{4}$ of an inch in diameter, and there are four protecting wires of $\frac{1}{16}$ inch section. What percentage of the cable consists of metal and what of hemp?

Ans. $12\frac{1}{2}\%$; $87\frac{1}{2}\%$.

(7) I buy pins 18 in a row and sell them 11 in a row at the same price; what do I gain per cent.? Ans. $63\frac{7}{11}\%$.

(8) If the 3 per cents. are at $92\frac{3}{4}$ and the 4 per cents. at $123\frac{1}{4}$, what sum is one investing when the difference of income is 1s.?

Ans. £457, 5s. $1\frac{1}{2}\frac{5}{2}$d.

N.B.—The greatest care is needed in arranging the solutions to sums. Obtaining the correct answer is but a small part of the work. Each sum must be a model of arrangement and method. Each line of working must be accompanied by a sufficient amount of explanation to render it perfectly clear. Without this full marks cannot be obtained.

11. *Algebra.*—Problems leading to Quadratics.

Work the following test paper:—

(1) Arrange the following in ascending powers of x and collect coefficients—

$$a^3 + a^2x + x^3 + bx^2 + c^2x + bcx - 2(a+b)x^2 + (ax+b^2)x.$$

Ans. $a^3 + (a^2+b^2+c^2+bc)x - (a+b)x^2 + x^3$.

(2) Divide the sum of

$2p^4x - 2p^3x^3 + 4px^4$ and $p^4x + 2p^3x^3 - 5p^2x^3 - x^5$ by $p^3 + px - x^2$.

Ans. $3p^2x - 3px^3 + x^3$.

(3) X is taken n times from Y with remainder Z. If mZ = X, show that Z is the G.C.M. of X and Y.

(4) Simplify—

$$\frac{\sqrt{(x^2+y^2)^2 - (x^2-y^2)^2}}{\sqrt{(x^2-y^2)^2 + 4x^2y^2}} + \frac{x^4 - y^4}{\sqrt{(x^2+y^2)^2 - 4x^2y^2}} - 2\left\{\frac{x+y}{\frac{1}{x} + \frac{1}{y}}\right\}^2.$$

Ans. $\frac{2xy}{x^2+y^2} + (x-y)^2$.

(5) Solve equations—

(*a*) $(4x+3)\left(1 - \frac{4}{x+3}\right) = 3x - 10 + \frac{(x+2)(x+a)}{x+3}$.

(*b*) $\frac{14}{x+1} = 6 - \frac{15}{x-10}$. Ans. $\frac{3}{11}$; 13 or $\frac{5}{6}$.

(6) I have a quantity. If I invert it I obtain the same amount as if I add $1\frac{1}{15}$ to it. What is the quantity? Ans. $\frac{5}{6}$.

(7) Distinguish between an identity and an equation.
Which of the following are equations and which identities:—

$$(x+a)(x^2 - bx + a^2) = x^3 + a^3.$$
$$(x-b)(x^2 + bx + b^2) = x^3 - b^3.$$
$$(x+a)(x-a) = x^2 - a^2.$$
$$\frac{1}{2}\left\{\frac{x-a}{2} + \frac{x+a}{2}\right\} = \frac{(x+a^2) - (x-a)^2}{8a}.$$

Women.—Simple equations.

Work the following:—

(1) Subtract $-2a(a+1)$ from a^3+1 and $2a(a-1)$ from a^3-1, and find the product of the remainders. Ans. $a^6 - 1$.

(2) Add $3a - 2(b-c)$, $3b - 2(c-a)$, and $3c - 2(a-b)$, and find the numerical value when $a=6$, $b=3$, $c=2$. Ans. 33.

(3) In a division sum the divisor is $4x^2 - x - 5$, the quotient is $3x^2 + 2x - 4$, and the remainder is $3x - 4$. Find the dividend.

Ans. $12x^4 + 5x^3 - 33x^2 - 3x + 16$.

(4) Divide $6m^4 - m^3n + 2m^2n^2 + 13mn^3 + 4n^4$ by $2m^2 - 3mn + 4n^2$.

Ans. $3m^2 + 4mn + n^2$.

(5) Find the square of $2k - 3l - 4m$.

Ans. $4k^2 + 9l^2 + 16m^2 + 24lm - 16mk - 12kl$.

(6) A farmer has to pack $(10p^2 - 29pq + 10q^2)$ eggs into $(2p - 5q)$ boxes. How many can he put in each? Ans. $5p - 2q$.

12. *Euclid.*—Book I., Props. 41-44, with four deductions per week.

Women.—Props. 29-32, with two deductions per week.

13. *Science.*—Magnetism: Properties of the loadstone and artificial magnet. The earth as a magnet. Laws of magnetic attraction and repulsion. Dip: The earth's magnetic poles.

The following questions have been asked on this section:—

(1) Each of two magnetised knitting needles is suspended by a thread in such a way that it will hang horizontally. In what direction will each needle settle itself when uninfluenced by the other? What magnetic action between the needles may be observed (1) when they are hung side by side; (2) when they are hung with the north-seeking pole of one just under the south-seeking pole of the other?

(2) What is a dipping needle? For what purpose would you employ it? How could you satisfy yourself that the dip was not due to the gravitational action of the earth?

(3) A compass and a magnetised knitting needle are laid upon a table. When one end of the knitting needle is placed close to the compass on the (magnetic) north side, the compass needle settles with its north-seeking end pointing to the (magnetic) north-west. Draw a diagram to show the directions of the various magnetic forces that keep the compass needle in the position in question. You may assume that the further end of the knitting needle is so far off that it does not influence the compass needle.

(4) A bar magnet is broken into four pieces. What magnetism do these pieces possess? How can you prove the truth of your answer?

(5) Two compass needles are put near together on a table. In what position may the needles be expected not to disturb one another? How will the needle behave when one compass is put to the magnetic north-west of the other?

(6) An unmagnetised iron bar is laid on a table. Draw a diagram to show how it becomes magnetised when it is taken up by the two poles of a horseshoe magnet.

(7) A dipping needle is mounted in the usual way. How will it behave (1) when its axis is placed in a magnetic east and west line; (2) in a north and south line?

(8) One end of a magnetised bar is dipped in iron filings. Draw a diagram showing the bar end on and the iron filings adhering to it. Give any explanation that seems necessary.

(9) Where are the magnetic poles, and where is the magnetic equator? How would you expect a dipping needle to behave if taken to these places?

14. *Spelling.*—Learn 100 words per week from *Words Commonly Misspelt*, Series C or D.

Test Questions.

1. *Penmanship.*—Write as specimens of copy setting:—

(*a*) Large hand—Physiographical.
(*b*) Small hand—And while he gazed wonderously at her, came
The Lord of Astolat out.

2. Give in your own words the summary of Bacon's remarks on Studies.

3. Analyse the following and parse words in italics:—

Let us swear
That you are *worth* your *breeding*, *which* I doubt not,
For *there* is none of you so mean and base
That hath not noble lustre in your eyes.
I see you *stand*, *like* greyhounds in the slips
Straining upon the start.

4. Punctuate the following:—

After a sibilant hissing sound equivalent to *s*, *z*, &c., the apostrophe alone is often used for the possessive singular, as for conscience' sake, Euripides' writings, but some prefer 's, *e.g.* St. James's Park.

And give rules for the semicolon.

5. Describe with a sketch map a coasting voyage from Cape York to Albany.

6. Say what you can of the native fauna and flora of Australia.

7. How do you account for the rapid advance made by the United States during the last half century?

8. What do you know of the following:—Fremont's Peak, Ohio, San Diego, Wyoming, Oklahoma, Bayou Peche, Colorado, Yosemite, Omaha?

9. What causes brought about the Peasants' Revolt, and what were the results of it?

10. Say what you can of the Lords Appellant and the Merciless Parliament or the Lollards.

11. Draw a genealogical table showing Henry IV.'s descent in relation to the other members of the royal family. Would you call his accession a usurpation?

12. What benefits accrued to the country from Henry IV.'s comparatively weak claim to the throne?

13. How could you prepare mercuric oxide, and how could you demonstrate that it was a chemical compound composed of oxygen and mercury?

PUPIL TEACHERS' COURSE

For Candidates' Examination, 1906.

Work to be Prepared.

1. *Reading and Repetition.*—Regular practice must be taken with these subjects before a competent critic. The exercises are comparatively valueless without due expression.

2. *English.*

(1) Learn 10 roots and meanings each week.

(2) Prepare carefully the grammar of the pronoun.

Learn a good classification and exact definition of each term employed. Note the difference in the use of *who*, *which*, and *that*. *What* is often called a compound relative because it does not require an antecedent and is often broken up into *that which*. This is incorrect, *e.g. I know what you want* does not equal *I know that—which you want*. *What you want* is a noun sentence governed by *know*. *But* is a relative pronoun when it is equivalent to a relative and negative, *e.g.* There is no man but honours you = There is no man *who* does *not* honour you. *As* is a relative after words like *such*, *same*.

Distinguish carefully between the personal pronoun, possessive case, *e.g.* my, thy, &c. The possessive pronouns which are never possessive case, *e.g.* mine, thine, ours.

Be careful also to distinguish the emphatic from the reflexive. He himself did it (emphatic). He hurt himself (reflexive). One, any, some, other, each, every, &c., are sometimes indefinite pronouns and sometimes indefinite adjectives.

(3) *Marmion.* Prepare the first 8 stanzas of Canto III. Read up the meaning of all allusions and references, be prepared to analyse any part and parse any word.

(4) Write an essay each week on such subjects as—

(*a*) Little strokes fell great oaks.

(*b*) Description of any incident you have either seen or read about.

(*c*) Courage.

(*d*) Some book you have recently read.

Think the subject well over before commencing to write, and make out an analysis or skeleton of what you are going to say. Divide the essay into paragraphs each dealing with one set of ideas. When you have written it in rough, go through it carefully and polish it up, improving any weak phrases or sentences.

The following hints may be of assistance to you.

(*a*) This is a proverb. Explain it literally, then go on to show its general meaning; by continually doing a little much is eventually achieved, &c.

(*b*) This is an exercise in word painting. Let your description be clear and graphic; try to make the reader see the scene as you saw it.

(*c*) Explain the term. Show that courage may be of two kinds—physical and moral. A soldier may risk life a dozen times and yet be afraid to speak the truth. Show when courage is necessary and give examples.

(*d*) This is a good exercise in condensing. The tendency will be to extend the essay to many times the proper length. This must be obviated by leaving out all irrelevant matter and yet leaving a clear concise account.

3. *History.*—Richard, John and Henry III.

The reign of Richard is mainly occupied by the Third Crusade. Read Scott's *Talisman*, which, though not historically accurate, gives an excellent idea of the contest. Note the misrule in England during Richard's absence.

John.—The worst king that ever sat upon the throne. Absolutely worthless in character.

Note loss of the French possessions—ultimately a boon to England. The Battle of Bouvines led to the signing of the Magna Charta—the keystone of English liberty. John's illegal actions united against him all classes of society and did much to bring the Normans and Saxons to be one people. Note the quarrel with the Pope over the election of an Archbishop—the Interdict and Excommunication—why did the latter fail to influence John while the latter effectually cowed him? The Magna Charta—chief terms must be carefully learnt. The Barons' War which followed.

Henry III.'s reign falls into three periods. (1) The King's minority when the kingdom was ruled well by Hubert de Burgh, the last of the great Justiciars. (2) The period of personal misrule. (3) The period of war and government by the Barons. The Mad Parliament and the Provisions of Oxford are very important. Note also De Montfort's Parliament and the great innovation it caused, viz. having representatives from the *Commons*—a thing unheard of before and the commencement of our present House of Commons.

4. *Geography.*—Austria, Switzerland, and Italy.

Prepare these countries as previously indicated. Draw outline maps, insert the names of all places to be remembered, and repeat till known. Note the dual nature of the Austrian Empire—German in the West, Hungarian in the East, with separate Parliaments. The Emperor of Austria is King of Hungary, but it is quite possible that the countries may separate at no distant date. Switzerland is famous for its scenery and Italy for its classical associations. Productions, imports, exports, and towns are very important. The Geographical Reading Book on Europe will materially assist, but the details must be committed to memory and not merely read through.

5. *Arithmetic.*—The Metric System. This is fully explained in the text-book (Christian and Collar), and must be carefully studied. It is extremely simple if followed in the right way. Learn the prefixes deci-, centi-, milli-, deka-, hecto-, kilo-, and their exact meanings. Note the connection between the units. Metre = unit. Weight of a cubic centimetre of water = gramme, square decimetre = are—unit of area, &c. The chief advantage of the system is that it does away with all compound rules, and there is no reduction, *e.g.*—

Find the value of 20 metr. 5 dm. 6 cm. 8 m. at 3 fr. 20 centimes per metre.

This equals $20{\cdot}568 \times 3{\cdot}20$ francs

$= 65{\cdot}8176$ francs.

Work the mental exercises and as many of the other examples given as possible.

6. *Algebra.*—Hall and Knight, Chapter V. Multiplication. Work through all examples V.E. and V.F. The latter is very helpful later on.

7. *Geometry.*—Euclid, Book I., Props. 13–16, with two deductions per week.

Practical. Work any general exercises on the work. Any good text-book will provide these. If any difficulty is found, write for assistance.

8. *Music.*—Semiquavers. Triplets. $\frac{4}{4}$, $\frac{6}{8}$, $\frac{2}{4}$ time.

9. *Science.*—The barometer and thermometer.

Read this up very carefully, and be prepared to explain exactly how each is made with glass tube and mercury. Note that the barometer does not foretell weather but merely indicates the weight of the air. From the latter we can often deduce the kind of weather expected.

10. *Spelling.*—100 words weekly from *Words Commonly Misspelt*.

11. *Penmanship.*—Write a page daily in the *Practical Teacher Copy Book*, and use the greatest care at all times. Good pen, good ink, and good paper are essentials to a beginner.

Test Questions.

1. Write as specimens of copy-setting:—

(1) Large hand—Dynamometer.

(2) Small hand—Down in the depths of the crystal sea
The dim lights gleam.

2. Analyse the following, and parse words in italics:—

How blest is he who crowns in shades *like these*
A *youth* of labour with an age of ease,
Sinks to the grave with unperceived decay,
While resignation gently stops the way,
And all his prospects *brightens* to the *last*,
His heaven commences *ere* this world *be past*.

3. How would you classify adjectives?

Write down the comparative and superlative degrees of old, bad, much, late, fat, wilful, amiable, clumsy, decent. Name some comparatives and superlatives that have no positive.

4. Write the following:—

(1) A's share is $\cdot\dot{0}\dot{0}$ of B's, B's is 3·08 of C's, C's is 1·1 of D's. C's share is £2750. Find A's, B's, and D's.

Ans. £770, £8470, £2500.

(2) How many oranges at £·084375 per dozen ought to be given in exchange for 378 eggs at ·0625s. each. Ans. 168.

(3) To $\frac{7}{13}$ of 5·8 add $2\frac{1}{2}$ of $\cdot\dot{9}3476\dot{1}$, and from the sum subtract $4\frac{1}{2}$ of $\cdot\dot{5}69230\dot{7}$. Ans. 3·45.

(4) Simplify $\dfrac{\cdot1428\dot{5}\dot{7}}{\cdot2857\dot{1}\dot{4}} + \dfrac{3\cdot\dot{4}28571}{4\cdot\dot{7}14285}$ Ans. $1\frac{5}{12}$.

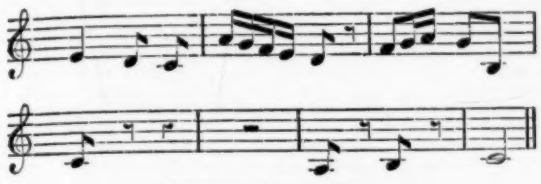
5. Give an account of the Civil War in the time of Stephen.

6. Explain clearly the cause of Henry II.'s quarrel with Becket. Which do you think was right?

7. Describe, with sketch map, a coasting voyage from Christiania to Hammerfest.

8. Say what you can of the chief industries of Russia, and name any towns particularly connected with them.

9. What is specific gravity? How would you find the specific gravity of a small number of leaden shot?

10. Write the following an octave lower in the bass clef, doubling the value of each note.

All communications respecting this Course to be sent to Mr. ARTHUR T. FLUX, Oakleigh, Belvedere, Kent, together with the coupon of the present number, and a stamped addressed envelope if an immediate answer is required.

OUR CERTIFICATE COURSE FOR 1906.

BY GEORGE COLLAR, B.A., B.SC.,

Head-Master of Stockwell Pupil-Teacher School.

Test Questions on Last Month's Work.

THEORY OF TEACHING

1. Explain clearly what is meant by "proceeding from the known to the unknown."

2. What is meant by the "preparation" step in a lesson? Sketch the preparation for lessons on the following: Compound Addition, The Lion, Coffee, Magna Charta.

3. Write full notes of a lesson on one of the following: (*a*) Division of Decimals; (*b*) the Ports of England; (*c*) The Air-pump.

ENGLISH LITERATURE.

1. Describe the first day of the fight against Satan.

2. Explain the following:—*Grateful vicissitude; Empyreal; In mighty quadrate joined; obvious hill; brayed, adamant, puissance, reins.*

ENGLISH HISTORY.

1. Who is sometimes called the "English Justinian"? On what grounds is the name given?

2. Give an outline of Edward III.'s wars with France.

3. Sketch the social history of England during the reigns of Edward III. and Richard II.

GEOGRAPHY.

1. Arrange ten places in England and Wales according to their average annual rainfall, and give reasons for your order.

2. Compare the lakes of Cumberland and Westmorland with the broads of Norfolk.

ARITHMETIC.

1. Multiply 37256 by 57; prove it by "casting out the nines," and say in what case the proof would not detect an error.

2. Prove that if a number be subtracted from any other formed of the same digits in different order, the remainder is divisible by 9.

ALGEBRA.

1. Prove that $a-(b-c)=a-b+c$.

2. Prove the rule of signs in Multiplication of Algebra.

GEOMETRY.

1. Prove that if a straight line meets two parallel straight lines it makes the alternate angles equal to one another.

2. Prove that if a straight line cut two other straight lines without making the alternate angles equal, these two straight lines are not parallel.

ELEMENTARY SCIENCE.

1. Define a solid, a liquid, and a gas. Does all matter exist in one or other of these forms?

2. State the law of Boyle, and describe an experimental way of proving it.

Syllabus and Notes for September.

ENGLISH COMPOSITION.

Prepare chap. vi., vii., and viii. in the *Art of Writing English*. Pay special attention to chap. vii., for among people who are fairly educated the most common errors arise in the use of wrong prepositions. As a general rule the prefix of the word with which the preposition is associated is the best guide to the proper preposition to use, thus we say different *from* (*dif*=apart) and we should say averse *from*, because averse means turned from, but averse *to* is so often used that it seems justified.

"What cat's averse to fish?"—GRAY.

Very frequently the same word is used with two or more prepositions but with different meanings—correspond with, and correspond to.

Students working from Nesfield should prepare chap. v. and work all the exercises.

Prepare essays on the following subjects, which were set this year at the Certificate Examination:—

(*a*) Vegetarianism.
(*b*) The co-education of the sexes.
(*c*) "Consistency is the virtue of fools."

THEORY OF TEACHING.

Study carefully Collar and Crook's *School Management*, chap. vii. On the Teaching of Reading, and put into practice in your class work as much as possible of the advice given there.

The student is required to study the "Educational ideas of Frœbel and Pestalozzi," and we propose now to give a short sketch of the principles of education as laid down by Frœbel. These may be summed up in five statements.

1. Education must be founded on a *religious* and on a scientific basis.

2. All true education must be *connected* and *continuous*, and if the teacher works systematically the education of the child will be *progressive*.

3. Educational treatment must be applied to each individual child, and must *call forth and guide his self-activity*. Its object must be to develop the latent powers of the child.

4. The teacher must take into account the two very important factors of the child's development—namely, *heredity* and *environment*.

5. The true educator will never separate training and instruction, but will select subjects for instruction which will help in the building up of character.

These rules should be committed to memory in the above concise form, but require further explanation.

1. Such a narrow meaning is frequently given to the term "religious teaching" nowadays, that Frœbel's first and fundamental principle is apt to be misunderstood. Frœbel desired that all children should be taught the Word of God; but by that he did not mean a denominational formula, or even simply the biblical text. Following the definition given by our Lord Himself in John xvii. 17—"Thy Word is Truth"—Frœbel taught that all truth is God's word, and that the child's simple inquiries about natural objects were searches after God. With this wide conception of religion, Frœbel did not advocate the teaching of religion as a thing apart, but as that which gave life and purpose to every subject adopted in the curriculum, and which would enable the child to fulfil the purpose of his existence, which he summarised as "to gain a clear knowledge of himself, to be at peace with nature and at one with God." The teacher's first care, then, is to lead his children to a pure and holy life by developing right habits of thought and action, and making the practice of religion the rule of daily life.

2. It seems remarkable that an educational reformer should ever have been needed to point out that it was wrong to attempt to teach in scraps, and that the proper way to educate is to correlate the different parts of the work. In the moral training we must recognise the fact that the child goes through certain definite stages, doing what is right—first in order to please its parents, perhaps to gain a reward or to avoid punishment, and proceeding through many stages of consciousness of right until the right principles are firmly established. Quite of late years, and under conditions which allow the teacher greater freedom in arranging the curriculum, much has been done in following out Frœbel's ideas on the correlation of studies; thus an object lesson on milk is followed by one on butter, one on cheese, etc.; while the songs, games, and recitations illustrate dairy work and cows. So, if the lesson has been on cherries, pictures of cherries, or the fruits themselves, are used in the number lesson and in the drawing lesson.

"Word-building" has arisen from a recognition of the fact that words are most easily learned, not as separate things, but through their relation to one another.

3. The third principle stated above is a recognition of the fact that there is in every child more or less *self-activity* or spontaneousness. In most children there is an abundance of it, and Frœbel tells us children should not be coerced into apple-pie order by repressing this self-activity, but it should be used as the chief motor force in shaping the education of the child. One great attribute of God is His creative power, and the natural desire of children to produce something is a manifestation of that creative power, in which when benevolently exercised, man most nearly resembles his Creator. It should be noticed that the activity of children should not be that of machines or missiles driven by some force from without, but rather it should mark the early stages of intelligent action, and the teacher must make it react upon itself in such a manner that the intelligence of the children may be developed. It is intelligence that prompts the actions, and the actions must be so guided and controlled that they may improve the intelligence. The more the child grows in intelligence, the more definite and more clearly directed to an object will be the activity, and the more carefully and systematically the objects are presented to the child the more will his intelligence grow. Hence Frœbel arranged a series of "gifts" or sets of objects for bringing this *self-activity* of the child under ordered and systematic treatment. There were originally seven gifts, as follows:—

First gift, the ball, or box of balls. This consists of a number of balls of worsted of the same size but of different colours. The ball was chosen as the first gift on account of its simplicity, and its perfect symmetry leaves little to be said about its parts. Its selection illustrates the principle of proceeding from the simple to the complex. This gift is used in teaching colours, and such properties as hardness or softness, and direction—up, down, right and left.

Second gift. A box containing a sphere, cylinder, and cube. With this gift the child is taught to contrast geometrical forms and to observe the parts of an object.

Third gift, or first building box. This consists of a large cube divided into eight smaller cubes. It is useful in teaching number, and the child can arrange the cubes so as to construct a large number of forms.

Fourth gift, or second building box. This consists of a cube divided into two in one direction, and four in another, so as to form eight bricks in which the length is twice the breadth, and the breadth is twice the thickness. This enables the child to avail itself of the differences in the dimensions of the blocks in forming different patterns.

Fifth gift, or third building box. This might be obtained by further section of the fourth gift. A large cube is divided into twenty-one whole cubes, six halves, and twelve quarters.

Sixth gift, or fourth building box. Another cube in which the division is carried out in a still different manner.

Seventh gift. This consists of five boxes of thin pieces of coloured wood, in the form respectively of squares, right-angled isosceles triangles, equilateral triangles, right-angled scalene triangles, and obtuse-angled triangles. The educational combinations possible with these are practically infinite.

Following the same principle, many other kindergarten gifts have been introduced, so that the *self-activity* of the child may be exercised on stick-laying, plaiting, pattern-picking, paper-folding, paper-cutting, cardboard-work, drawing, embroidery, and modelling.

4. Frœbel rightly contends that to educate the child aright it is necessary to consider his relation to the rest of the human race, and the two most important ways in which this relation affects education are *heredity* and *environment*. By the former we denote the tendency that the child has to resemble its parents or ancestors. If the teacher were perfectly cognisant of the characters of a child's parents and ancestors, he would know practically all about the natural tendencies of the child. But he can only generalise and conclude that the factors which have influenced education in times past will have an influence now. Moreover, there is always a close resemblance between the way in which an individual pupil acquires a knowledge of any particular subject and the way in which the whole sum of information has been acquired by men at large (see Collar and Crook, pp. 73, 74); hence it is important that the teacher should, as a rule, know something of the history of the subject he has to teach. But we must consider not only the tendencies with which a child is born, but also the *scope* afforded to those tendencies by the child's surroundings or *environment*. Frœbel laid great stress on this, and following the philosophy of Locke, he showed how the child, like a "suckling babe," was continuously drinking in the impressions made by its surroundings, and using them as so much mental food. He speaks of environments as of three kinds:—(*a*) *Natural environments*, by which he means the natural objects—flowers, trees, animals, air, &c.—by which the child is surrounded; (*b*) *social environments*, or the human beings with whom the child is brought into contact, especially the family at home, and teacher and school-fellows at school; (*c*) *Divine environment*, including all those attendant circumstances which purify and elevate his mind and develop his higher nature. The classification is not a logical one, because the third is made up of the best and noblest of the other two. The duty therefore of teachers is evident. So far as it is possible, the school should be a place where the children have bright and happy surroundings, and these will largely co-operate with the oral lessons given by the teacher in the true education of the child.

5. The reader has often heard the difference between *education* and *instruction* pointed out. The difference is great, it is true, but Frœbel pleads that they should not be separated; but that instruction should be the instrument by which we educate. Instruction alone is a dry skeleton, and education is flabby and invertebrate without instruction. The teacher must therefore bear Frœbel's fifth canon in mind, and teach his pupils not merely how to get a living but how to live. We trust from what we have said that the student will see that there is a wide difference between teaching on Frœbel's principles and the mere use of kindergarten games in school. The seven gifts may be used in exactly the same form as Frœbel devised them, but if the children's activity proceeds from the driving of the teacher and is not a *self-activity*, prompted and stimulated it is true by the teacher, but proceeding from within the child, Frœbel's principles are not being followed.

Although it sometimes happens in our infant schools that games are carried on without the spirit of Frœbel, yet the most regrettable weakness in our school system is the abrupt change which too frequently occurs when a child passes from a well-conducted infant school to a senior department. It is to be hoped that the methods of Frœbel will be extended and developed so as to carry the child well into the senior department, and that the spirit may permeate his later work.

English Language and Literature.

Read Scott's *Woodstock*, and make notes that will help you to write a short account of any personage or episode in the book.

Prepare in detail *Paradise Lost*, 262–718.

274. *Brooks not*, does not tolerate.

278. *Doom*, punishment. The noun is connected with the verb "to deem," and once meant judgment; now it denotes the punishment which is supposed to follow a judgment.

280. *Precipitate thee*, hurl thee headlong. Latin *pre*, foremost, and *caput*, the head.

295. *Parle*, talk. They left off speaking.

312. *Constellations*, groups of fixed stars. Latin *con*, with or together, and *stella*, a star. *Planet* means a wanderer, and the planets are so called because they are continually changing their places among the fixed stars.

319. *As not of power*, as not being powerful enough. The two opponents appeared evenly matched in *might*, *i.e.*, force with which they struck, and in *swift prevention*, or quickness in parrying blows.

322. *Keen nor solid*, no weapon by its keenness or firmness. The adjectives are used for the nouns.

328. *Convolved*, rolled up together. Latin *con*, *volvo*, I roll.

367. *Moloch*, the god of the Ammonites, to whom children were "made to pass through fire." In the first book he is described as—

> "Moloch, horrid king, besmeared with blood
> Of human sacrifice, and parents' tears;
> Though, for the noise of drums and timbrels loud,
> Their children's cries unheard that passed through fire
> To his grim idol. Him the Ammonite
> Worshipped in Rabba and her watery plain."

365. *Adramelech*, God of the inhabitants of Sepharvaim, to whom infants were burnt in sacrifice.

371. *Arioch*, the name literally means "a fierce lion."

372. *Ramiel*, this name means "one that exalts himself against God."

381. *Just* = justice; *illaudable*, not worthy of praise.

385. *Infamy*, literally the negative corresponding to "fame," but generally used as the opposite of fame.

399. *Phalanx*. The Greek armies were drawn up in order of battle, originally five deep; this was eventually increased to fifteen in order to increase the weight of the onslaught on which the result of the battle largely depended. To give an idea of irresistible force which can be exerted in all directions, Milton describes the angelic host as a "cubic phalanx."

404. *Unobnoxious*. In Milton *noxious* means injurious, from

CLOUGH'S CORRESPONDENCE COLLEGE,

The Oldest and Most Successful Correspondence College

Temple Chambers, London, E.C.

P.T. CLASSES

These Classes provide thorough training in accordance with Appendix C of the New Regulations. Full particulars free on application.

KING'S SCHOLARSHIP

The Class for December 1905 is FULL, and the list is therefore closed.

*** The Class in preparation for the 1906 SCHOLARSHIP EXAMINATION, under the New Regulations, is now at work. To secure admission, immediate application is necessary.

☛ A copy of the Syllabus of the **PRELIMINARY EXAMINATION FOR THE CERTIFICATE** (the Examination which is to take the place of Scholarship) will be sent free on application.

CERTIFICATE

Intending Students for July 1906 are advised to commence without delay.

Certificate Class for 1907: Applications now entertained.

MATRICULATION

The January 1906 and June 1906 Classes are now at work.

☛ ***Clough's Classes have been adopted for their teachers by many Education Authorities, and are strongly recommended by H.M. Inspectors, School Managers, Head Teachers, and Past and Present Pupils.***

For Prospectus, Syllabus, Entry Form, and full particulars of any Class, write to--

THE SECRETARY,

Clough's Correspondence College,

Temple Chambers, London, E.C.

Latin *noceo*, I injure; but *obnoxious* is used in its primary sense —"exposed to injury": *ob*=against.

406. *Night*, see the first twelve lines of this book.

411. *prevalent*=prevailing, in the act of winning.

421. *Affect*=lay claim to.

440. *to better us and worse our foes.* We often use "better" as a verb, but "worse" is not so used in modern English.

447. *Nisroch*, the name means "Great Eagle," and was applied to an idol of the Ninevites which was represented on their sculpture with the head of a great bird of prey.

454. *Against impained, impassive*, against those who have felt no pain and are able to feel no pain. The word "impassive" now frequently means giving no sign of feeling. Compare Campbell's description of Oneyda—

> "Impassive, fearing but the shame of fear,
> The Stoic of the Woods, a man without a tear."

481. *Ambient*, travelling about.

484. *Hollow engines*, notice the poetic terms in which Milton describes the cannon. It is not an easy thing to describe a mechanical invention in dignified poetical language. Try to give such a description of a motor-car.

498. *Each.* This pronoun is nominative to a verb omitted; supply "admired" from the previous clause, remembering that to admire meant originally to wonder, or else supply "said." We should now use the gerundial construction, "how he missed being the inventor."

512. This describes the manufacture of gunpowder, which consists of 75 parts nitre or saltpetre, 10 parts charcoal, and 15 parts sulphur.

519. *Missive ruin*, ruin that was sent to a distance. Latin *mitto*, I send. *Incentive*=that which sets fire to something. Latin *incendo*=I set on fire. This refers to the match with which the cannon was fired.

523. *Orient*, rising. Latin *oriens*=rising, pres. part. of *orior*, I arise.

526. *Panoply*, complete armour. Greek *pan*=whole, *hopla*=arms.

542. *Adamantine*=of hard steel or iron; sometimes it means a diamond, and so figuratively anything very hard.

544. *Even or high*, on a level in front of him, or above him, since it may be necessary to protect himself from showers of fiery arrows.

549. *Alarm*, from the Italian *all' arme*=to arms.

572. *Triple row of pillars laid on wheels*, the cannon which had just been invented by Satan.

605. *Second tire*, the second row or "tier."

620. *Belial.* From such a verse as 1 Sam. ii. 12—"Now the sons of Eli were the sons of Belial," one might suppose that Belial was a definite personage, and Milton speaks of him as one of the worst of the evil spirits. See Bk. I. 490:—

> "Belial came last; than whom a spirit more lewd
> Fell not from heaven, or more gross to love
> Vice for itself."

The word really means the lawless or worthless one; and the student should remember that there are no adjectives in Hebrew, so the expression "sons of Belial" is equivalent to "worthless sons" or lawless sons.

651. *Whelmed*, overturned so as to cover something up. That which is covered is said to be "overwhelmed."

657. *Pent*, really the past participle of "to pen," to fasten with a pin; hence "fixed in."

666. *Jaculation*, throwing, hurling.

670. *Wrack*, another form of wreck; we generally use the word in the phrase "wrack and ruin."

679. *Assessor*, lit., one who sits by the side, hence a judge's assistant; now it means one who adjusts taxes.

709. *Unction*=anointing.

English History.

Revise the outlines of English history from the accession of Henry IV. to that of Henry VII.

The relations with France during this period require close attention. You cannot dismiss the subject by saying that we won the battle of Agincourt and gradually lost our possessions through the appearance of Joan of Arc. The conditions of France must be studied, so as to understand why we were successful in the reign of Henry V. and unsuccessful in that of his son.

The social condition of England must be carefully studied. Read the volume on *Mediæval England* in the "Story of the Nations" series, which can be obtained at practically every public library, and ought to be on the book-shelf of every teacher. Study the Wars of the Roses in relation to social causes and effects.

Geography.

No mistake is more common than to imagine that the geography of our own islands is well known. The tendency is to learn up facts and not associate them with principles. We will take a few illustrations. On looking at a map the student imagines that the most natural and effective boundary is a river; but, as a matter of fact, rivers run through the bottom of valleys and form a place where people meet, and not a barrier which separates them. A high ridge or chain of mountains, on the other hand, is an effective barrier to frequent communication. The sea forms an effective border to Great Britain as a whole and to Ireland. Scotland is divided from England by the Cheviots, and in the east by the Tweed, but the history of Berwick shows how far from satisfactory the river is as a boundary. The Pennine Chain divides the three N.W. counties from the three N.E. ones. The Thames is quite exceptional in forming a boundary between counties, but the other great rivers—Trent, Yorkshire Ouse, Great Ouse, and Severn, and the Spey, Clyde, and Tay in Scotland, follow the general rule. In the case of agricultural districts the administrative centre seems first to have been fixed in the most populous points and the boundaries agreed upon by mutual consent between them—in this case frequently in arbitrary lines, and sometimes along the course of streams. Study the map of Great Britain and endeavour to account for the position of as many boundaries as possible.

The mineral products of Great Britain are closely connected with the geological formation, and the student who knows a little geology has a great advantage in the study of them. The coal measures in which true English coal is found occurs at a low level on both sides of the Pennine Chain and near to the Welsh mountains.

The most productive area for iron ore is the district stretching from Cleveland to Northamptonshire among the Jurassic rocks. Great quantities of red hematite are found in Furness and Cumberland among the carboniferous limestone, and in the coal measures are found abundant clayband iron ores.

Lead is found in Cumberland, Westmorland, and Furness in the North, in Derbyshire, in Somerset among the Mendip Hills, also in Devon, Cornwall, and the Isle of Man. The lead is generally mixed with a certain quantity of silver, although not always sufficient to make its extraction remunerative.

The recent "North Sea Incident" should serve to remind the student of the great importance of the fisheries carried on over the Dogger Bank. Of late years there has been a great falling off in the quantity of flat fish—plaice, soles, etc.—taken, partly from the capture of immature fish, for although fish below a certain size are not allowed to be sold, yet they generally die when they are returned to the water after being dragged up in the trawl. It is partly owing to the falling off in the supply of food, and the Government has fitted out a steam-trawler and appointed some naturalists to investigate the matter.

Live stock also forms a very important part of the productions of the British Isles. Great care is taken in the breeding of domestic animals, and the British breeds are renowned all over the world and much sought after for improving the breed in other countries. Among horses our thoroughbred racers, hackneys, Clydesdales, and shire horses, among horned cattle, the shorthorns and Jerseys, for dairy purposes, and the Aberdeen-Angus, Devons, and Herefords for beef, are very famous. The most famous breeds of sheep are the Leicesters, Cotswolds, Hampshire Downs, Southdowns, and Cheviots. Of pigs the chief are the Yorkshire, Berkshire, and Tamworth pigs.

Arithmetic.

Study the chapters on Vulgar Fractions, pay particular attention to the theory and to the methods of teaching, including graphic and other illustrations.

Algebra.

The sections in Algebra correspond with those in Arithmetic: prepare Hall and Knight, chap. xi.–xiv.

Geometry.

Prepare to the end of page 94 in Christian and Pratt and work the exercises: send up any that present any special difficulty.

General Elementary Science.

Matter in Motion. Representation of motion by straight lines. Velocity. Acceleration—remember that time must come twice in the specification of acceleration, *e.g.*, feet per second per second. Force. The laws of motion. Work and energy.

Gravity, Gravitation, Density, *i.e.*, weight of unit of volume. Weight, Specific Gravity—compare specific gravity with density. Weight of bodies in air and in water. Water finds its own level. General laws of fluid pressure.

MESSRS. BLACKIE'S SCHOOL SERIES

The Application of the New Code

THE NEW CODE: "*Instruction should be given in the Elementary rules of personal health in respect of food, drink, cleanliness, and fresh air.*"

The Laws of Health.

The Code has been anticipated in respect to the above requirement by the issue of BLACKIE'S "LESSONS ON LIVING" (1s. 6d.), a reading book for Standards V., VI., VII. In a succession of most interesting and attractive lessons the book deals with the elementary rules of personal health in respect of food, drink, cleanliness, and fresh air. Physiology and kindred subjects are also introduced, and talks upon such subjects as the "framework" and the "covering" of the body, the heart, and the circulation, digestion and food, breathing and the air, the brain and the nervous system, are dealt with, and the laws of health set forth in a way likely to imprint them in the memory. The book is proving exceedingly popular in schools, and will be found of great use wherever the subject of Hygiene, &c., is taken up. A corresponding Handbook for Teachers is published, price 6d.

Domestic Science.

To girls the importance of an early familiarity with the main principles of Domestic Science can hardly be overestimated, and it is obvious that instruction in the elementary laws of personal health, together with habits of thrift, joined with a knowledge of how to perform the ordinary duties of the house neatly and economically, are eminently worthy of attention. The lessons in BLACKIE'S DOMESTIC ECONOMY READERS provide a complete course of *practical* instruction in these subjects, and also in cooking, laundrywork, and household management, &c. They are not scientific manuals packed with theory and technical terms, but bright, interesting books, which the children may read for their pleasure, and yet learn many things unaware. DOMESTIC SCIENCE Prospectus post free on application.

"Every useful aid for the teacher is provided; and taking these volumes as examples, this series of *Domestic Economy Readers* must be held to satisfy every practical requirement of good teaching, from the point of view of teacher, manager, or parent."—**School Government Chronicle** (reviewing Nos. III. and IV.).

THE NEW CODE: "*Lessons on Citizenship may be given with advantage in the higher classes.*"

Citizenship.

This subject presents many difficulties, but with the aid of Mr. Oscar Browning's well-written manual, "THE CITIZEN: HIS RIGHTS AND RESPONSIBILITIES," the task is considerably lightened. In a series of interesting chapters the scholars are led step by step from the affairs of the parish to those of the Empire at large, showing in detail the relations between the individual citizen, the community, and the ruling authorities. The difficulties which are inevitable in dealing with such subjects have been lightened, and the interest sustained throughout. A further important point is that the number of technical terms used has been reduced to a minimum.

In reviewing the work **The Bookman** says: "Of all the text-books already published on the subject this one seems to be the most practical"; while **The Educational Times** says: "Mr. Oscar Browning's book is excellent workmanship."

THE NEW CODE: "*Mensuration should be taught to older boys.*"

Elementary Mensuration.

Teachers will find an admirable course of lessons provided in Mr. Martin's "ELEMENTARY MENSURATION" (Lines, Surfaces, Solids), 10d. Mr. Martin has been Normal Master in one of the leading Training Colleges, and his book shows how thoroughly conversant he is with the needs and capabilities of young children. The book runs to some 80 pages, and if it is conscientiously worked through, a *broad* foundation will be laid which will enable any scholars who intend to pursue the subject to do so with credit.

THE NEW CODE: "*In the higher classes one or two books should be read as a whole.*"

Continuous Readers.

"All the four books are of high educational value in the broadest sense. We wish every child in the Upper Standards could become familiar with at least one of the Series." Such is the verdict of *The Schoolmaster* upon Messrs. BLACKIE'S CONTINUOUS READERS. The books are by leading authors, among whom appear the names of G. A. Henty, G. Manville Fenn, Lady Gilbert, and Sarah Tytler.

In addition to these books, published at one shilling, Messrs. Blackie are issuing an entirely new series of books for Continuous Reading, at a lower price, and the first volumes are now ready. The series will include books for both Boys and Girls and for Lower and Upper Standards. Teachers will therefore find a wide range of suitable books to select from in BLACKIE'S CONTINUOUS READERS.

THE NEW CODE: "*The English Language, including . . . reading for information both silently and aloud.*"

School Libraries.

The days when School Libraries were looked upon as a luxury are now passed, for we find teachers unanimous all over the country that an efficient school library is essentially a part of an efficient school.

The chief stumbling-block in procuring a really good library seems to have been in the difficulty of obtaining an adequate number of volumes out of the small amount of money available. This difficulty has been overcome in a practical way by the issue of Messrs. Blackie's now world-known School and Home Library. The series numbers some 63 volumes, and the following is a table of its cost:—[*Full particulars may be had on application.*]

63 Vols. at 1s.	...	...	£3 3 0
Less School Discount ...		...	0 15 9
			£2 7 3

THE NEW CODE: "*The Geography of the chief foreign countries should be taught in some detail.*"

Foreign Countries.

In a series of five brightly written volumes, Blackie's ILLUSTRATED CONTINENTAL GEOGRAPHY READERS deal with the geography of the world in a manner at once attractive and instructive. Each book is provided with a series of beautifully coloured photographs and other illustrations, and contains, in addition to the outline maps in the text, a complete series of coloured sketch maps.

THE NEW CODE: *Observation Lessons and Nature Study, &c., &c.*

Nature Study.

An admirable course of lessons in this interesting subject will be found in BLACKIE'S NEWTON NATURE READERS. The lessons are simple, and free from technical language, and the elementary truths of natural and physical science are presented in a new and attractive manner. There is an Infants' Reader, and there are six books for the Standards.

For the *teacher*, Prof. Scott Elliot's "Nature Studies" (Plant Life, 3s. 6d.), will well repay perusal. A recent review concludes with the happy expression, "It seems to give me new eyes."

Full particulars of the Readers and Teacher's Handbook may be had on application to Messrs. Blackie & Son, Limited, 50 Old Bailey, London.

OUR SCIENCE SECTION

☞ **Subscribers requiring Explanations of Difficulties in any branch of Science, or Advice upon Courses of Study, can obtain all help required by communicating with the Editor, and accompanying their query with the Coupon cut from this number.**

MATHEMATICS.

(STAGES 2 AND 3.)

BY FRANK CASTLE, M.I.M.E.,

Royal College of Science; Lecturer on Mathematics, etc., Morley College; Author of "Elementary Practical Physics," "Practical Mathematics," etc.

THE following course is primarily intended for those readers who are preparing for the Examinations in Stages 2 and 3, Pure Mathematics, of the Board of Education.

It is not possible in the limited space at disposal to give a complete course, but rather to supplement the information which may be obtained from any of the numerous text-books on the subject. Questions selected from recent examination papers will be introduced from time to time. The solutions to many of these, together with the answers to the remainder, will enable those who may be working without the aid of a teacher to test their progress.

Readers who experience any difficulty are advised to communicate with the Editor.

It is probably not necessary to specify text-books. Hall and Knight's Algebra, and any good modern text-book on Trigonometry may be used.

Simplifications, Involution and Evolution.—These sections of the subject as a rule are not very troublesome, especially to those who have a fair acquaintance with the rules of indices, but in all cases it is advisable to obtain as much practice as possible in the simplification of a given algebraical expression, *i.e.* raising such an expression to some given power, or extracting the square or cube root of it. In the latter case it may be necessary to arrange the given expression in ascending or descending powers of one of the letters.

Ex. 1. (*a*) Given that

$$x + y + z = a,\ yz + zx + xy = b,\ \text{and } xyz = c,$$

find the value of

$$y^2z^2 + z^2x^2 + x^2y^2$$

in terms of a, b, c.

(*b*) If $x + y + z = 10$, $yz + zx + xy = 31$, and $xyz = 30$, find the value of

$$(y + z)(z + x)(x + y). \qquad (1905)$$

(*a*) $x+y+z=a$ (1). $yz+zx+xy=b$ (2). $xyz=c$ (3).

Squaring (2) we obtain

$$y^2z^2 + z^2x^2 + x^2y^2 + 2yxz^2 + 2y^2xz + 2x^2yz = b^2,$$
$$\text{or } y^2z^2 + z^2x^2 + x^2y^2 + 2yxz\,(z + y + x) = b^2.$$

Substituting from (1) and (3),

$$\therefore y^2z^2 + z^2x^2 + x^2y^2 + 2c + a = b^2,$$
$$\therefore y^2z^2 + z^2x^2 + x^2y^2 = b^2 - 2ac.$$

(*b*) $(y + z)(z + x)(x + y)$.

This reduces to

$$(x + y + z)(zx + xy + yz) - xyz$$
$$= 10 \times 31 - 30 = 280.$$

Ex. 2. Extract the square root of

$$x^6 - 2x^5 + 5x^4 - 6x^3 + 6x^2 + 4x + 1.$$

The square root is found to be

$$x^3 - x^2 + 2x - 1.$$

Ex. 3. (*a*) If x and y are rational quantities, and $\sqrt{a}$, $\sqrt{b}$ quadratic surds, show that if $(x + \sqrt{a})^2 = y + \sqrt{b}$,

$$\text{then } (x - \sqrt{a})^2 = y - \sqrt{b}.$$

(*b*) Find the square root of $174 - 36\sqrt{6}$.

(*a*) Let $\sqrt{174 - 36\sqrt{6}} = \sqrt{x} - \sqrt{y}$.

Squaring both sides

$$174 - 36\sqrt{6} = x + y - 2\sqrt{xy}.$$
$$\therefore x + y = 174 \qquad (1)$$
$$\text{and } 2\sqrt{xy} = 36\sqrt{6}.$$
$$\text{Squaring, } 4xy = 7776. \qquad (2)$$

Also from (1) $(x + y)^2 = 174^2 = 30276$

$$\therefore (x + y)^2 = 30276$$
$$\text{and } 4xy = 7776$$

By subtraction $(x - y)^2 = 22500$

$$\therefore x - y = 150.$$

Also $x + y = 174$

$$\therefore x = 162,\ y = 12.$$

$$\text{Hence } \sqrt{174 - 36\sqrt{6}} = \sqrt{162} - \sqrt{12}$$
$$= 9\sqrt{2} - 2\sqrt{3}.$$

Ex. 4. Reduce to its simplest form

$$\frac{3}{\sqrt{5} + \sqrt{2}} - \frac{1}{\sqrt{3} + \sqrt{2}}$$

Find which is the smaller—

$$\sqrt{5} \text{ or } \sqrt[3]{11}. \qquad (1904)$$

Ex. 5. Find the value of

$$\frac{1 + x}{1 + \sqrt{(1 + x)}} + \frac{1 - x}{1 - \sqrt{(1 - x)}}$$

$$\text{when } x = \frac{\sqrt{3}}{2}. \qquad (1905)$$

Ex. 6. Extract the square root of—

$$x^{12} - 8x^9 + 18x^6 - 8x^3 + 1. \qquad (1898)$$

Ans. $x^6 - 4x^3 + 1$.

SMITH'S CLASSES

THE MOST POPULAR CLASSES OF THE DAY.

THE MOST HELPFUL.
THE MOST SUCCESSFUL.
ABSOLUTELY THE BEST.

NEW CLASSES BEGIN AUGUST 28—SEPTEMBER 2

Matriculation, June 1905

"The credit of my success lies entirely with you, and I thank you heartily for the help you have given me.
D. I. G."

Oral Classes.

St. Martin's Schools,
Charing Cross,
London, W.C.

Certificate, 1905

"Thanks to you I cleared the papers in Mathematics."

For

SCHOLARSHIP,
1905-6-7.

CERTIFICATE,
1906-7.

MATRICULATION,
1906-7.

A.C.P., 1905-6.

OXFORD LOCALS,
1906.

And for all other Exams.

Matriculation, June 1905

"I am extremely grateful for the interest you took in me, and I am sure that I should not have got through without your help.
R. J. P."

Tuition by Post.

Rosebery House,
Bream's Buildings,
Chancery Lane, E.C.

Scholarship, 1904

"All last year I worked with ——, and then failed. This year I was in your class for six months, and then got a First."

Write to Mr. Smith at once.
If you have difficulties, tell him what they are.
If you cannot join a Class at present, tell him why.
If you think any other Class better, tell him in what respect.

The postage will cost you a PENNY.
Mr. SMITH will send you advice that may be worth POUNDS.

If you have not seen Mr. Smith's Papers, write for Specimens.
If you do not know about his Classes, he will give you the address of some student in your neighbourhood to whom you can refer.

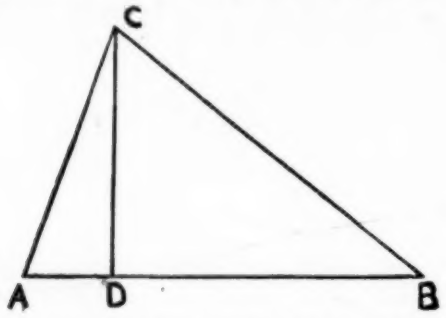
JOIN A CLASS. JOIN THE BEST CLASS.

JOIN SMITH'S CLASS.

Please write for Prospectus to - - -

Mr. H. J. SMITH, B.Sc., Rosebery House, Bream's Buildings, Chancery Lane, E.C.

Ex. 8. (*a*) Two sides and the included angle of a triangle are



given; explain how the remaining parts can be found by dividing the triangle into two right-angled triangles.

(*b*) In a triangle ABC given, $b = 3251$, $c = 4793$, $A = 71° 18'$. Find the angles B and C by the method indicated above, the dividing line being drawn from C to AB.

(*a*) In the triangle ABC draw CD perpendicular to AB; then from the given data AD can be obtained, and therefore DB = 4793 − AD is known.

DC is calculated from $DC = b \sin A$, and finally the angle B from $\tan B = DC \div DB$.

(*b*)
$$AD = 3251 \cos 71° 18' = 3251 \sin 18° 42',$$
$$\log AD = \log 3251 + L \sin 18° 42'$$
$$= 3·5120170 + 9·5059811 - 10$$
$$= 3·0179981 = \log 1042·3.$$
$$\therefore AD = 1042·3.$$
$$DB = 4793 - 1042·3 = 3750·7,$$
$$CD = 3251 \sin 71° 18',$$
$$\log CD = \log 3251 + L \sin 71° 18',$$
$$= 3·5120170 + 9·9764464 - 10,$$
$$= 3·4884634,$$
$$\tan B = CD \div DB.$$
$$L \tan B = \log CD - \log DB + 10,$$
$$= 3·4884634 - 3·5741123 + 10,$$
$$= 9·9143511.$$

From tables—

$L \tan 39° 24' = 9·9145596$
$\quad\quad\quad

PROFESSOR MEIKLEJOHN'S SERIES

Books for Certificate Students

I. THE PRINCIPLES AND PRACTICE OF TEACHING.

THE PRINCIPLES AND PRACTICE OF TEACHING AND CLASS MANAGEMENT. By JOSEPH LANDON, F.G.S., late Vice-Principal in the Saltley Training College. **Sixth Edition.** Crown 8vo. 548 pp. ... ... **5s.**

II. ENGLISH LANGUAGE, LITERATURE, AND COMPOSITION.

THE ENGLISH LANGUAGE: ITS GRAMMAR, HISTORY, AND LITERATURE. By J. M. D. MEIKLEJOHN, M.A. **Twenty-Sixth Edition.** Enlarged, with Exercises and Additional Analysis. Crown 8vo, 486 pp. ... ... **4s. 6d.**

ENGLISH LITERATURE. A New History and Survey from Saxon Times to the Death of Tennyson. By J. M. D. MEIKLEJOHN, M.A. Demy 8vo. 650+viii. pp. ... ... **6s.**

THE ART OF WRITING ENGLISH. A Manual for Students: with Chapters on Paraphrasing, Essay-Writing, Précis-Writing, Punctuation, and other matters. By J. M. D. MEIKLEJOHN, M.A. **Fourth Edition.** Crown 8vo, 340 pp. ... ... **2s. 6d.**

COMPOSITION FOR SCHOOLS AND COLLEGES, BASED ON OUTLINE ESSAYS. With Exercises on Style. By C. H. MAXWELL, B.A. Crown 8vo, 144 pp. ... ... **1s.**

III. MATHEMATICS.

A NEW ARITHMETIC, Theoretical and Practical. By G. A. CHRISTIAN, B.A. (Lond.), and G. COLLAR, B.A. (Lond.). **Eleventh Edition.** Crown 8vo. 552 pp. ... ... **4s. 6d.**

A Key to the New Arithmetic. 6s. net.

IV. (a) HISTORY.

A NEW HISTORY OF ENGLAND AND GREAT BRITAIN. With Maps and Tables. By J. M. D. MEIKLEJOHN, M.A. **Twentieth Edition.** Crown 8vo. 740 pp. ... ... **4s. 6d.**

THE BUILDING OF THE BRITISH EMPIRE (1497–1900). With Notes on the Growth of Constitutional Government in the Colonies, Imperial Federation, Statistical Tables, Etymology of Colonial Names, Biographies of Empire Builders, and Five Double-Page Maps in Colours. By ARTHUR T. FLUX. Crown 8vo, 254 pp. ... ... **2s.**

TEST QUESTIONS IN HISTORY. Selected from Public Examination Papers. Arranged by A. T. FLUX. Crown 8vo. 80 pp. ... ... **1s.**

IV. (b) GEOGRAPHY.

A NEW GEOGRAPHY ON THE COMPARATIVE METHOD. With Maps and Diagrams, and an Outline of Commercial Geography. By J. M. D. MEIKLEJOHN, M.A. **Thirty-third Edition** (revised). Crown 8vo. 630 pp. **4s. 6d.**

THE BRITISH EMPIRE: ITS GEOGRAPHY, RESOURCES, COMMERCE, LANDWAYS, AND WATERWAYS. By J. M. D. MEIKLEJOHN, M.A. **Seventh Edition** (revised). Crown 8vo, 350 pp. .. .. **3s.**

THE COMPARATIVE ATLAS. By J. G. BARTHOLOMEW, F.R.G.S., and edited by J. M. D. MEIKLEJOHN. **New and Improved Edition.** Containing 64 Plates, Map Drawing, Geographical Etymology, and a General Index ... **2s. 6d.**

TEST QUESTIONS IN GEOGRAPHY. Selected from Public Examination Papers. Arranged by A. T. FLUX. Crown 8vo. 82 pp. ... ... **1s.**

SEND FOR COMPLETE CATALOGUE.

MEIKLEJOHN & HOLDEN, 11 Paternoster Square, E.C.

pressure to which it is subjected remains constant. This is equivalent to saying that under constant pressure and between the same temperatures all gases have the same coefficient of expansion. Another law connecting the pressure and temperature of a gas may be deduced from Boyle's Law and Gay-Lussac's Law, and may be stated thus:—*The pressure of a given mass of any gas varies directly as the absolute temperature if the volume of the gas remains constant.*

In addition to these laws we may also note here *Avogadro's hypothesis*, which assumes that "*In equal volumes of different gases under the same conditions of temperature and pressure there are the same number of molecules.*"

A theory, known as the "*Kinetic Theory of Gases*," has been built up to account for these laws, and this theory, in a reasonable and logical way, deduces them from the known laws of moving bodies. The Kinetic Theory is the joint product of many minds, and has been evolved gradually; but the greater part of it is due to Maxwell and Clausius.

The particles of a gas (which we may take as being usually identical with the chemical molecules) are supposed to be separate bodies moving with a considerable velocity in straight lines in all directions. Sometimes the particles will collide with each other, sometimes they will encounter the walls of the vessel within which they are enclosed. They, however, are supposed to be perfectly elastic bodies, and for our present purpose we may regard the walls of the containing vessel as being perfectly elastic; hence no energy is lost in these encounters, changes in relative velocities and directions only being produced.

The impacts of the molecules on the walls of the vessel constitute the pressure exerted by the gas on the walls of the vessel, and the total pressure is equal to the total change of momentum of the particles on striking. Now since under ordinary circumstances we have in any measurable quantity of a gas an enormous number of molecules, we shall always have as many molecules moving in any one direction as in any other, and consequently the pressure in all directions should be the same.

Experimentally we find that the pressure in a gas is the same in all directions.

Let us call the mass of any molecule m and its velocity u, and suppose it strikes the wall at right angles. Being perfectly elastic, it will rebound with a velocity equal to its original velocity u, but as it is travelling in the opposite direction its velocity will now be represented by $-u$.

Originally its momentum was mu; it is now $-mu$. The change in momentum is therefore $2mu$ at each impact.

If we could calculate the total change in momentum experienced by all the molecules by their impacts on the walls in a given time we could then state the total pressure on the walls.

To make the calculation as simple as possible, let us suppose that n molecules are enclosed in a cube of which any edge is c centimetres in length. Although the velocities of the molecules may not be all alike, there will be a mean velocity which we will call u.

Now for a moment consider the case of a single molecule. It may be moving in a direction which is not parallel to any one side of the cube, but we may resolve its velocity into three component velocities parallel to the edges of the cube. Call these components d, e, and f. The kinetic energy of the molecule is $\frac{1}{2}mu^2$, and the above components must obviously satisfy the equation $\frac{1}{2}mu^2=\frac{1}{2}m(d^2+e^2+f^2)$, for the energy is still the same.

If we now consider the motion of a single molecule moving with a velocity component and parallel to one edge of the cube it will strike the walls $\frac{d}{c}$ times per second, as d is the distance travelled in one second, and c is the distance across the cube. The change in momentum at each impact is $2md$. Multiplying this by $\frac{d}{c}$, the number of impacts per second, we get the total change per second, $2md.\frac{d}{c}$; that is to say, the total change of momentum of this molecule on this one pair of parallel walls is $\frac{2md^2}{c}$. The changes on the other two pairs of walls will be $\frac{2me^2}{c}$ and $\frac{2mf^2}{c}$ respectively, and the total on all the walls will be $\frac{2md^2}{c}+\frac{2me^2}{c}+\frac{2mf^2}{c}$, or $\frac{2m}{c}(d^2+e^2+f^2)$; but $(d^2+e^2+f^2)$ is equal to u^2. Therefore the total pressure exerted by this one molecule on all the walls is $\frac{2mu^2}{c}$.

Now, since there are n molecules, the total pressure exerted by all the molecules on all the walls will be equal to $\frac{2mnu^2}{c}$.

The surface of one face of the cube is c^2, and the total surface of the six faces $6c^2$. Dividing the total pressure $\frac{2mnu^2}{c}$ by the total surface $6c^2$ we get $\frac{2mnu^2}{c\times 6c^2}$ or $\frac{2mnu^2}{6c^3}$ as the pressure per unit area. Now c^3 is the volume of the cube and therefore of the gas, and we may substitute for this v where v is the volume of the gas. Call the pressure p, then we have

$$p=\frac{2mnu^2}{6v}=\frac{1}{3}\frac{mnu^2}{v}$$

or $pv=\frac{1}{3}mnu^2$.

Now mn represents the total mass of the gas which, of course, remains constant, and u is constant provided the temperature is constant, hence the right-hand side of the equation remains constant if the temperature is constant; that is, the product of the pressure and volume is constant provided the temperature is constant. This is Boyle's Law, which is thus satisfactorily accounted for by the theory.

We have so far assumed that the vessel containing the gas was cubical in shape, but the result holds whatever the shape of the vessel may be, for we may consider a space of any shape to be made up of an infinitely great number of small cubes, and the pressures on the opposite sides of a face common to two cubes would neutralise each other, and would not affect the pressure on the outer faces of the outside cubes which form the surface of the vessel.

The expression $\frac{1}{2}mu^2$ represents the kinetic energy of a single molecule. The expression $\frac{1}{3}mnu^2$ on the right-hand side of the above equation may be written in the form $\frac{2}{3}.n.\frac{1}{2}mu^2$, which evidently represents $\frac{2}{3}$ of the total kinetic energy of the gas, and this is equal to the product of the pressure and volume. We have imagined gases to be composed of large numbers of moving particles. When the kinetic energies of the particles of such bodies of moving particles are equal the bodies are in equilibrium.

Also when gases can be mixed without undergoing change of temperature or pressure we know they are in equilibrium. This will be so when their temperatures and pressures are the same.

If we take several gases at the same temperature and pressure then they are in equilibrium, and if we keep the pressures constant and raise the temperatures of them all equally they would still all be under similar conditions of temperature and pressure, and could be mixed without further change taking place. Hence their kinetic energies must have been changed to the same extent.

Hence also the product of pressure and volume must have been changed equally in all cases, for this, as we have seen, is proportional to the kinetic energies of the particles of each gas. We have, however, kept the pressure constant throughout, and therefore the volume must have changed equally for all the gases for the same rise in temperature.

Hence we may state, in agreement with Gay-Lussac's Law, that all gases expand to the same extent for equal rises in temperature.

PHYSIOGRAPHY.

(STAGES 2 AND 3.)

THE THERMOMETER (*Continued*).

HAVING now filled the thermometer bulb and tube with mercury, the whole is next raised a little above the highest temperature for which it is proposed to employ the thermometer, and the tube sealed off at a suitable point so as to give the required range. This point can be determined approximately by a preliminary experiment. The mercury is emptied from the little cup and the tube is then allowed to cool in a bath, through a certain number of degrees as registered by another thermometer. The motion of the end of the mercury column in the stem is measured, and from this, by simple proportion, the length of the stem required may be found. Having sealed off the thermometer, it is allowed to cool gradually and is then placed in pounded ice and allowed to remain until the thread becomes stationary. A mark

HORACE MARSHALL & SON'S NEW BOOKS . .

A FIRST HISTORY OF ENGLAND. By C. L. THOMSON, late of Somerville College, Oxford, and the Cambridge Training College. Part VI. (1689–1820), ready immediately. **2s. 6d.**

The Schoolmasters' Yearbook (1905) says of Part V. :—"... Throughout, the book gives evidence of Miss Thomson's wide experience, careful research, and sympathetic treatment, and is quite the best of its kind at present in the market."

ILLUSTRATIVE HISTORY. Fully Illustrated.

British and Old English Period (55 B.C.–1066 A.D.). By E. J. BALLEY, B.A. *Now ready.* **2s.**

Mediæval Period (1066–1487). *In Preparation.*

Tudor Period (1487–1603). By N. L. FRAZER, B.A. *Now ready.* **2s.**

Stuart Period (1603–1714). By J. W. B. ADAMS, M.A., Headmaster of the County School, Tenby. *Ready early in September.* **2s. 6d.**

MEDIÆVAL HISTORY. By M. A. HOWARD, B.A. Illustrated. *Ready in September.* **2s. 6d.**

A NEW "ROMANCE READER"—"Tales of the Middle Ages." Edited by C. L. THOMSON, and fully Illustrated. *Will be ready early in September.* **1s.**

THE MAGIC HOOK, and other Plays for Children. By MARION LINKLATER THOMSON. Three charming little English Plays written for the Author's own Pupils, and suitable for Children from seven to fourteen years of age. *Ready early in September.* **1s.**

New Volumes in the "Carmelite Classics"

READY IMMEDIATELY

I. Small Series

MACAULAY—Life of Goldsmith. Paper, **3d.**

MACAULAY—Life of Johnson. Cloth, **8d.**

SHELLEY—Adonais. Paper, **3d.**

MARLOWE—Dr. Faustus. Cloth, **8d.**

II. Large Series

SPENSER—Faerie Queene: Book I. Edited by C. L. THOMSON. Cloth. **1s. 4d.**

THE NEW TEMPLE READER. Edited by E. E. SPEIGHT, B.A., F.R.G.S., Illustrated. *Ready.* **1s. 6d. net.**

THE PREPARATORY TEMPLE READER. Edited by C. L. THOMSON. With Coloured and Black and White Illustrations. *Ready.* **1s. 6d.**

BOTANY RAMBLES. By ELLA THOMSON. In Three Parts. Profusely Illustrated. *Ready.*

Part III. **Autumn** . . . . **1s.**

HAKLUYT'S ENGLISH VOYAGES. Edited by E. E. SPEIGHT, B.A., F.R.G.S. With an Introduction by Sir CLEMENTS MARKHAM. Illustrated by R. MORTON NANCE. *Ready.* **2s. 6d.**

STORIES FROM THE NORTHERN SAGAS. Edited by A. F. MAJOR and E. E. SPEIGHT. With Illustrations by W. G. COLLINGWOOD, M.A., and R. MORTON NANCE. *Ready.* **2s. 6d.**

SEND POST-CARD FOR

New Illustrated Catalogue and Specimen Booklets

POST FREE.

TEMPLE HOUSE AND 125 FLEET STREET, E.C.

AYRES' CLASSES

CORRESPONDENCE CLASSES

FOR

PUPIL TEACHERS, SCHOLARSHIP

1906 and 1907,

CERTIFICATE

1906,

NOW AT WORK

Syllabus, Book List, &c., on Application

CERTIFICATE 1907 WILL BEGIN IN SEPTEMBER

BEST PREPARATION OBTAINABLE

ORAL CLASSES

MEET AT

181 ALDERSGATE STREET, E.C.

Intending Students should join at once

For Prospectus, Testimonials, &c., apply to

Mr. H. B. AYRES

4 Arundel Square, BARNSBURY, LONDON, N.

is now made on the stem indicating the position occupied by the top of the thread. The thermometer is now immersed in steam, in a vessel also surrounded with steam. The barometer is read at the same time and the temperature of the boiling-point at that particular pressure taken from the tables. The point at which the mercury stands in the thermometer stem is marked. If the pressure is normal this point is taken as the upper fixed point on the thermometer, and for a Centigrade thermometer the distance between the two marks will have to be divided into one hundred divisions. If the pressure is not 760 mm., then a correction is necessary. The correction may be made in the following way. Suppose the temperature corresponding to the pressure is 99·5° C., then the length of tube between the two marks represents 99·5 degrees. From this we can find the length required for 100 degrees by dividing the length by 99·5 and multiplying by 100. The mark can then be altered to suit. The thermometer is now waxed over, and the distance between the two marks divided by a machine into one hundred equal divisions. The divisions are marked by a point or knife-edge on the machine which cuts right through the wax to the glass and leaves the glass bare. The numbers are next engraved in the wax and the thermometer is suspended in the vapour of hydrofluoric acid, which etches the glass where it is uncovered. The wax is now removed by warming and wiping with a cloth, and the figures and marks filled in with black or red composition to make them more easily read. In the case of a thermometer required to read below 0° C. and above 100° C., it is usual to make the divisions beyond these two points the same distance apart as are those between them. If the thermometer is to be used for accurate work it is then compared with a standard air thermometer and a table of corrections made.

Although mercury thermometers are very convenient for ordinary use they are not perfect, and certain precautions must be employed in using them if good results are desired. The following are amongst the chief points which should be remembered.

1. The stem of the thermometer should be heated to the same temperature as the bulb, otherwise a very serious error may be made in making a determination. To see how important this is, let us consider the empirical correction which is generally made in determining melting-points and boiling-points of substances when a considerable portion of the stem is exposed. The correction to be added to the actual reading is given by the formula

$$n(T - t)\ 0{\cdot}000154.$$

Where n is the length of the thread exposed measured in terms of the divisions on the thermometer stem, T is the temperature as read, t is the mean temperature of the exposed thread of mercury as read on a second thermometer placed with its bulb at the centre of the exposed thread, and 0·000154 is the coefficient of apparent expansion of mercury in glass.

Suppose we are taking the melting-point of a substance and the whole of the stem above zero is outside the bath, and suppose the reading taken is 260° C. and the mean temperature of the projecting stem is 60° C. The correction will then be

$$260(260 - 60)\ 0{\cdot}000154,$$

which $= 8{\cdot}008°$.

The corrected melting-point will then be 268° C.

When the temperature is not so high the correction is smaller but still important.

2. An error may be introduced owing to capillarity. If the bore of the tube is very fine, a considerable amount of sticking of the mercury in the bore occurs. Hence there is a limit to the smallness of the bore which can be used.

3. An error may be introduced if the bulb is subjected to pressure. The bulb is made thin so as to allow heat to pass through the glass freely, and if a considerable pressure is exerted on the bulb the mercury is forced up the stem. Small errors are even introduced by using a thermometer in a different position from that in which it was standardised. For instance, if the thermometer is intended to be used in a horizontal position and it is afterwards used in a vertical position, the extra internal pressure due to the upright column of mercury may be considerable, especially if the bulb is flat or cylindrical.

4. Errors may creep in owing to peculiarities in the glass. For instance, if a sensitive thermometer made from soft glass is placed in ice and the zero checked, and the thermometer then heated to 100° C. and then cooled again in the ice, it will be found that the mercury does not come back exactly to its original position. The glass has been expanded and it takes some time for it to contract again to its original volume. The change has sometimes been known to occupy months. Hard glass suffers less in this way than soft soda glass.

OUR QUERY COLUMN

RULES.

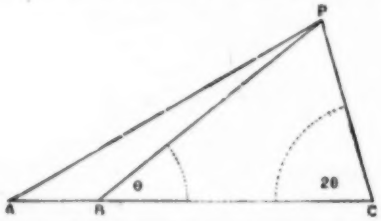
1. Each correspondent is restricted to *one* question.
2. Each query must be accompanied by the name and address of the correspondent, and the *coupon* which appears on the back wrapper of the current number of the Journal.
3. CORRESPONDENTS MUST IN ALL CASES STATE THE SOURCE FROM WHICH THEIR QUERY HAS BEEN OBTAINED.

The Editor reserves to himself the right to decline to answer any question which is, in his judgment, unsuited to the Magazine.

X.Y.Z.—ABC are three points in a straight line, such that BC = 3 AB, and P is a point outside the line, such that the angle PCB is equal to twice the angle PBC; prove that

$$PA = PC + \tfrac{1}{3} AC.$$

(Honours Trigonometry, Leaving Certificate, 1905.)



Denoting the angles PBC, PCB by θ and 2θ respectively, from the triangle PBC we have

$$\frac{PB}{PC} = \frac{\sin 2\theta}{\sin \theta} = \frac{2 \sin \theta \cos \theta}{\sin \theta} = 2 \cos \theta$$

$$\therefore PB = 2\ PC \cos \theta \quad \ldots\ldots\ldots\ldots \quad (1)$$

From the triangle PAB we have

$$AP^2 = AB^2 + BP^2 + 2\ AB,\ BP \cos \theta.$$

Writing in the last equation the value of BP given by equation (1) we have

$$AP^2 = AB^2 + 4\ PC^2 \cos^2 \theta + 4\ AB,\ PC \cos^2 \theta.$$

$$\therefore AP^2 - AB^2 = 4\ PC\ (PC + AB) \cos^2 \theta.$$

$$\therefore \cos^2 \theta = \frac{AP^2 - AB^2}{4\ PC\ (PC + AB)} \quad \ldots\ldots\ldots \quad (2)$$

Again, from the triangle PAC, we have

$$AP^2 = AC^2 + CP^2 - 2\ AC,\ CP \cos 2\theta.$$

$$= AC^2 + CP^2 - 2\ AC,\ CP\ (2 \cos^2 \theta - 1).$$

$$\therefore 4\ AC,\ CP \cos^2 \theta = AC^2 + CP^2 + 2\ AC,\ CP - AP^2.$$

$$\therefore \cos^2 \theta = \frac{(AC + CP)^2 - AP^2}{4\ AC,\ CP} \quad \ldots\ldots \quad (3)$$

Equating the two values of $\cos^2 \theta$ obtained in (2) and (3) we have

$$\frac{AP^2 - AB^2}{4\ PC\ (PC + AB)} = \frac{(AC + CP)^2 - AP^2}{4\ AC,\ CP}$$

$$\therefore \frac{AP^2 - AB^2}{PC + AB} = \frac{(AC + CP)^2 - AP^2}{AC}$$

Cambridge University Press.

BOOKS SUITABLE FOR KING'S SCHOLARSHIP EXAMINATION, 1905-6.

Author	Work	Editor	Price
Shakespeare	King Henry V. (Alternative subject allowed in place of "Much Ado about Nothing.")	A. W. VERITY	1/6
Scott	The Lay of the Last Minstrel	J. H. FLATHER	2/-
Bacon	Essays	A. S. WEST	3/6
Quintus Curtius	A Portion of the History. (Alexander in India.)	W. E. HEITLAND & T. E. RAVEN	3/6
Lucian	Charon, Somnium, &c.	W. E. HEITLAND	3/6

CERTIFICATE EXAMINATION, 1906.

Author	Work	Editor	Price
Milton	Paradise Lost Books V. and VI.	A. W. VERITY	2/-
,,	Lycidas, Ode on the Nativity, L'Allegro, Il Penseroso	,,	2/6
,,	Sonnets	,,	1/6
,,	Comus and Lycidas	,,	2/-

THE ELEMENTS OF ENGLISH GRAMMAR. By A. S. WEST, M.A., Trinity College, Cambridge. New and Enlarged Edition. 70th to 85th Thousand. Extra fcap. 8vo. 2s. 6d.

Guardian.—"It is far and away the best of its class hitherto published for boys of thirteen to sixteen years of age, and, if we mistake not, will soon become a standard text in secondary schools, and mark a new epoch in the teaching of English Grammar."

A KEY TO THE QUESTIONS CONTAINED IN WEST'S ELEMENTS OF ENGLISH GRAMMAR AND ENGLISH GRAMMAR FOR BEGINNERS. By A. S. WEST, M.A. 3s. 6d. net.

THE ELEMENTS OF TRIGONOMETRY (Intended for the use of Students commencing Trigonometry). By S. L. LONEY, M.A., Professor of Mathematics at the Royal Holloway College (University of London). Extra fcap. 8vo, 3s. 6d. (A Prospectus will be sent on application.)

School World.—"The author's text-book of 'Plane Trigonometry' is so favourably known that nothing more need be said about the exposition of this book than that it possesses the merits of the larger work."

ELEMENTARY GEOMETRY (Practical and Theoretical). By C. GODFREY, M.A., Head Master of the Royal Naval College, Osborne, and A. W. SIDDONS, M.A., Fellow of Jesus College, Cambridge, Assistant Master at Harrow School.

Now Ready (1) Complete in One Volume, Third Impression, large crown 8vo, pp. xi. + 355, 3s. 6d.

Or (2) in Two Volumes, Vol. I. (Experimental Course and Books I. and II.), 2s. Vol. II. (Books III. and IV.), 2s.

Or (3) in Five Parts: Part I., Experimental Geometry, 1s. Part II., Theoretical Geometry, Book I., 1s. Part II., Book II. (Area), 1s. Part II., Book III. (The Circle), 1s. Part II., Book IV. (Similarity), 1s.

ANSWERS TO THE EXAMPLES, 4d., *post free.*

SOLUTIONS TO THE EXERCISES, by E. A. PRICE, B.A., 5s. *net.*

THE CAMBRIDGE SERIES FOR SCHOOLS AND TRAINING COLLEGES.

General Editor—W. H. WOODWARD, *Professor of Education in the University of Liverpool.*

ARISTOTLE ON EDUCATION: Being Extracts from the "Ethics and Politics." Translated and Edited by J. BURNET, Professor of Greek in the United College of St. Salvator and St. Leonard, St. Andrews. Crown 8vo, 2s. 6d.

THE EDUCATION OF THE YOUNG, in the "Republic of Plato." Translated into English, with Notes and Introduction, by B. BOSANQUET, Author of "A Companion to Plato's 'Republic.'" Crown 8vo, 2s. 6d.

THE MAKING OF CHARACTER: Some Educational Aspects of Ethics. By JOHN MACCUNN, Balliol College, Oxford, Professor of Philosophy in University College, Liverpool. Crown 8vo, cloth, 2s. 6d.; cloth extra, gilt top, 3s. 6d.

London: Cambridge University Press Warehouse, Fetter Lane. C. F. CLAY, Manager.

W. & A. K. Johnston's Drawing Publications

In the Press

Brush Drawing and Nature Study Charts

By T. ANSELL

A complete practical and artistic course of Brush Drawing for Schools. To be published in three sets, sixteen charts in a set.

Each Chart contains one or more Natural Objects, such as are easily obtainable. The natural size and appearance of each object is first shown, then the elements of brush drawing necessary to depict it, and lastly, the method of applying these so as to form the complete drawing.

The colouring of the Charts will be found specially attractive.

Size of each Chart 18½ by 22½ inches.

Price of each Set in compact cloth case on stout paper, **8/6**; on strong cards, **10/6**.

The Charts will shortly be followed by Drawing Cards and Books in facsimile.

A Complete List of Drawing Publications sent free on application.

W. & A. K. JOHNSTON, Limited,
Edina Works, Easter Road, Edinburgh;
7 Paternoster Square, London, E.C.

GIBSON'S
PROGRESSIVE ARITHMETIC.

Book I., 2d.; II., 2d.; III., 2d.; IV., 3d.; V., 4d.

1. **Exercises, numerous and varied**—
   Each book contains a full year's work. In no class and at no stage is the pupil required to work for days or weeks in the one groove. There is variety to add interest and make the Arithmetic lesson, under the guidance of the teacher, alive.
2. **Constant Revision**—
   In nearly every exercise there is included material for revision, thus making sure that no previous instruction has been forgotten.
3. **Concrete and Abstract Examples**—
   Concrete examples are introduced at the earliest stage and continued throughout the series, but abstract examples are numerous and judiciously intermingled, so as to secure sufficient practice in the manipulation of figures.
4. **Mental Arithmetic**—
   Types and suggestions of a practical nature, suitable to the stage arrived at by the pupil, have been placed at the end of each book.
5. **Arrangement**—
   Each page has at the head the new matter introduced into the exercises on that page. The pupil, therefore, has before his eyes the information required in the working of the new problems. The language throughout is simple.

ROBT. GIBSON & SONS (Glasgow), LTD.,
45 QUEEN STREET.

Denoting for brevity AP by l, AB by m and CP by n, and remembering that AC = 4 AB, we have

$$\frac{l^2 - m^2}{m+n} = \frac{(4m+n)^2 - l^2}{4m}$$

$$\therefore l^2\left(\frac{1}{m+n} + \frac{1}{4m}\right) = \frac{m^2}{m+n} + \frac{(4m+n)^2}{4m}$$

$$\therefore \quad l^2(5m+n) = 4m^2 + (m+n)(4m+n)^2.$$

$$\therefore \quad l^2 = \frac{20m^2 + 24m^2n + 9mn^2 + n^3}{5m+n}$$

$$\therefore \quad l^2 = 4m^2 + 4mn + n^2.$$

$$\therefore \quad l = 2m + n.$$

But l = AP, n = PC, and $2m$ = 2 AB = $\frac{1}{2}$ AC.

$\therefore$ AP = PC + $\frac{1}{2}$ AC.

Bike.—The question you quote is worked out in full in most of the larger works on *Statics*. See, for example, Minchin's *Statics*.

Sinew.—ABC is a triangle. At A are applied forces k . BC, l . CA, m . AB parallel to BC and along CA, AB, respectively. Show that their resultant is the resultant of the forces $(k-l)$ AC along AC, and $(m-k)$ AB along AB, and hence find where it cuts the base BC.

(*Tutorial Statics.*)

In addition to the three given forces let there be applied at A the three forces k . CB, k . BA, k . AC parallel to CB and along BA, AC, respectively. The last three forces being proportional to the sides of the triangle CBA taken in order represent a system in equilibrium. Hence the resultant of the forces acting at A is unaffected by the introduction of the last three forces. Further it is obvious that the six forces acting at A now reduce to two, viz., $(m-k)$ AB along AB, and $(k-l)$ AC along AC. Therefore the resultant of the three given forces is the resultant of $(k-l)$ AC along AC, and $(m-k)$ AB along AB.

Let P denote the point in which the resultant of $(m-k)$ AB, $(k-l)$ AC cuts the base BC.

Draw PQ, PR parallel to BA, AC respectively, PQ meeting AC in Q, and PR meeting BA in R. Then by the parallelogram of forces we have

$$\frac{PQ}{PR} = \frac{(m-k)\,AB}{(k-l)\,AC}.$$

$$\therefore \frac{PQ}{PR} \cdot \frac{AC}{AB} = \frac{m-k}{k-l} \quad \ldots\ldots\ (1)$$

But from the triangle PCQ we have

$$PQ = \frac{\sin C}{\sin Q} \cdot PC = \frac{\sin C}{\sin A} \cdot PC.$$

Similarly from the triangle PBR we have

$$PR = \frac{\sin B}{\sin A} \cdot PB.$$

$$\text{Hence } \frac{PQ}{PR} = \frac{\sin C}{\sin B} \cdot \frac{PC}{PB}$$

$$\therefore \frac{PQ}{PR} = \frac{AB}{AC} \cdot \frac{PC}{PB}.$$

Then from (1) we have

$$\frac{AB}{AC} \cdot \frac{PC}{PB} \cdot \frac{AC}{AB} = \frac{m-k}{k-l}$$

$$\therefore \frac{PC}{PB} = \frac{m-k}{k-l}.$$

Hence the resultant meets BC in the point P such that $(m-k)$ BP = $(k-l)$ CP.

W.H.—The distance along a straight line from A to B is one-quarter of a mile; find to within an inch how much greater is the distance from A to B along an arc of a circle of radius 2000 feet. Also find to within 20 square feet, the area enclosed between the arc and the straight line.

(London Matriculation, 1905. Advanced Mathematics.)

Let C be the centre of the given circle. Then if D be the middle point of the chord AB, we have

$$\sin ACD = \frac{\frac{1}{2} \times 440 \times 3}{2000} = 0{\cdot}33.$$

From the tables we find $\angle ACD = 19{\cdot}269°$ nearly.

Hence $\angle ACB = 38{\cdot}538°$ nearly.

Length of arc AB = 2000 × radian measure of $\angle ACB$

$$= 2000 \times \frac{38{\cdot}538}{180}\pi = 428{\cdot}2\,\pi \text{ feet.}$$

$\therefore$ Length of arc AB = 1345·23 feet, nearly.

Length of chord AB = $\frac{1}{4} \times 1760 \times 3$ feet = 1320 feet.

Hence the distance along the arc AB is greater than the straight line AB by (1345·23 − 1320) feet; that is, by 25 feet 3 inches, within an inch.

Area of sector ACB = $\frac{1}{2}$ (arc AB) × (radius AC)

$= \frac{1}{2} \times 1345{\cdot}23 \times 2000$ square feet.

= 1,345,230 square feet

(within 10 square feet).

But the area of the triangle ACB is given by the formula

$\sqrt{\{s(s-a)(s-b)(s-c)\}}$, where

$s = \frac{2000 + 2000 + 1320}{2}$ feet, and $a = b = 2000$ feet, and

$c = 1320$ feet.

Hence the area of the triangle ACB

$= \sqrt{\{2660 \times 660 \times 660 \times 1340\}}$ square feet,

$= 13200\sqrt{\{133 \times 67\}}$ square feet,

= 1,246,050 square feet

(within 10 square feet).

Hence the area enclosed between the arc and the straight line is equal to

(1,345,230 − 1,246,050) square feet

= 98,180 square feet

(within 20 square feet).

Arum.—If a man sits still in a railway carriage travelling with uniform velocity with one eye open, show that the distances of objects in the landscape from the rails are in the same proportion as the times they are visible to him from the window.

(Mechanics, Stage 2, 1902.)

Let O be the position of the observer's eye at any instant, and AOB the angle within which objects in the landscape are visible at O. Let P in OB be the position of an object at the instant under consideration. If OX be the direction of the train's motion, and PQ drawn parallel to OX meet OA in Q, then if v denote the speed of the train and t the time during which P is visible, we have PQ = vt.

Similarly if P_1 be any other point in OB, and P_1Q_1 drawn parallel to OX meet OA in Q_1, then if t_1 is the time during which P_1 is visible, we have $P_1Q_1 = vt_1$.

Hence PQ : $P_1Q_1 = vt : vt_1 = t : t_1$.

Draw PN, P_1N_1 perpendicular to OX,

then PN : P_1N_1 :: PQ : P_1Q_1.

Hence PN : P_1N_1 :: $t : t_1$.

De Serf.—You will find the Royal Windsor History Reader, Book VI. (Nelson and Sons), the one best adapted to your needs. It fulfils the requirements of the Alternative History Courses for Standards VI. and VII. It is written in a very able manner and splendidly produced.

CONSULTATIVE COMMITTEE OF THE BOARD OF EDUCATION.

The President of the Board of Education has appointed Mr. Arthur Christopher Benson, late an Assistant Master at Eton College, to be a Member of the Consultative Committee, *vice* the Rev. Canon the Hon. Edward Lyttelton, who has resigned his membership upon his appointment as Head Master of Eton.

BRITISH MUSEUM 29 AU 1905

THE

EDUCATIONAL MUSICAL INSTRUMENT CO.

(ESTABLISHED 1881.)

For Lists and Designs apply to the

MANAGER,

43 Estate Buildings, Huddersfield; 21 Argyle Crescent, Portobello, Edinburgh; 3 Unity Street, Bristol; or 19 Highbury Place, London, N.

MANY THOUSANDS of Teachers, School Managers, &c., including **Twenty-five of H.M. Inspectors of Schools,** are using and recommending our Instruments, of which we have specimens **in every County of the British Isles.**

SCHOOL PIANOS, &c., A SPECIALITY.

We have **over 1,800** in use, our large trade enabling us to offer unapproached bargains. You would also find our **Violin Outfits for Orchestral Classes** unequalled in quality and price.

See our **45 Guinea** Prize Medal Upright Iron Grand Piano for **£21 cash,** or thirty-six payments of 14s. 2d. per month. Quite new, rich, full tone, and thoroughly durable.

We pay carriage, give a month's free trial, a ten years' warranty, and **exchange free of cost** if the instrument sent is not all that is desired.

Dr. MACNAMARA, M.P., Editor of *The Schoolmaster*, writes under date August 30, 1904:—"We are more than delighted with the Piano which you recently selected for and supplied to us. Any of my friends who need an instrument cannot possibly do better than place themselves entirely in your hands."

Mr. J. H. YOXALL, M.A., M.P., Gen. Sec. N. U. T., writes:—"For the fourth time I have experienced for myself, or for relatives, the special value, wide selection, and expert advice which your clients gain. Each of the four Pianos has given perfect satisfaction."

Show-rooms open daily. Write for our List of Instruments for Home or School Use, specifying the class preferred.

WE CAN SAVE YOU MANY POUNDS.

(Please mention this Paper.)

Writers

WILL FIND IN A

"SWAN"

Fountain Pen

a practical and ever ready helper.

Of **Invaluable Service** for **Reports, Corrections, Exercises, Correspondence, &c.**

Prices: 10/6, 16/6, 25/- upwards.

Of all Stationers, Jewellers, &c.

T. J. Macnamara, Esq., M.P., *Editor "The Schoolmaster,"* **says—"I would as soon think of leaving my keys at home as my Fountain Pen. It is as essential a part of my outfit as my boots, behaves much better than *they* do, and stands a lot more wear and tear. Every man who lives by his pen should wear it near his heart, and then his goose will indeed be a 'Swan.'"**

Write for Catalogue of "SWANS" as supplied to H.M. Stationery Office, London School Board, Municipal Corporations, and Pitman's Metropolitan School.

Mabie, Todd, & Bard,

79 & 80 HIGH HOLBORN, LONDON, W.C.

BRANCHES—93 Cheapside, London, E.C.; 95a Regent Street, W.; 3 Exchange Street, Manchester, New York, and Paris.

NEW CODE CONTINUOUS READERS.

"In the higher classes one or two books should be read as a whole." THE NEW CODE, 1905.—*"English Language."*

NELSON'S

6d. Net. **SIXPENNY CLASSICS** 6d. Net.

A New Series of the most popular reprints in LARGE, READABLE TYPE, with beautifully printed Frontispiece. Tastefully bound in CLOTH, with gilt lettering on back. Some of the volumes contain nearly 600 pages. All are UNABRIDGED.

A TALE OF TWO CITIES (DICKENS).
TOM BROWN'S SCHOOL DAYS (HUGHES).
THE DEERSLAYER (FENIMORE COOPER).
HENRY ESMOND (THACKERAY).
HYPATIA (KINGSLEY).
THE MILL ON THE FLOSS (GEORGE ELIOT).

NELSON'S SUPPLEMENTARY READERS

PRICE **3d.** each, Paper

A SERIES OF SPECIALLY EDITED, SPECIALLY ANNOTATED, and SPECIALLY CHEAP Supplementary Readers for the Higher Standards and Evening Continuation Schools, designed to give a RANGE AND VARIETY OF GOOD READING.

16 Books now ready. List of Titles on Application.

PRICE **4d.** each, Cloth

☞ *Nelson's Educational Catalogue post free.*

T. NELSON & SONS, 35 & 36 Paternoster Row, London, E.C.; Edinburgh; Dublin; and New York

THE EDITOR'S TABLE

AMERICAN BOOK COMPANY.

(1, 2.) **Steps in English, Book One** and **Book Two.** By John Morron, M.S., A. C. M'Lean, A.M., and Thomas C. Blaisdell, A.M.

(3.) **Stories from Life: A Book for Young People.** By Orison Swett Marden. (Eclectic School Readings.)

(4.) **Lives and Stories worth Remembering.** By Grace H. Kupper, M.A. (Eclectic School Readings.)

(5.) **Self-Help.** By Samuel Smiles. Edited with notes and an appendix by Ralph Lytton Bower. (Eclectic School Readings.)

(6.) **Twelve Christmas Stories.** By Charles Dickens. Edited by Jane Gordon. (Eclectic School Readings.)

These issues by the American Book Company are produced in the substantial and tasteful form which characterises their publications, and form excellent matter for the schools for which they are designed. Nos. 1 and 2 are bulky books treating of composition and grammar on modern and rational lines. The others are suitable for extra reading books. No. 5 is very carefully annotated, but one note, on the Corn Laws, is a sample of the unconscious humour which is really the finest type of American humour: "The Corn Laws were class legislation.....Class legislation is expressly prohibited by the constitution of the United States." Of course!

All the books are excellent of their kind.

Text-book of General Physics for High Schools and Colleges. By Joseph S. Ames, Ph.D. This volume, which includes sections on mechanics, properties of matter, heat, vibrations and waves, sound, light, magnetism, electrostatics, and electrodynamics, will be found to be a useful, comprehensive, and complete elementary treatise on physics. In the section dealing with mechanics, one of the best features is that as much emphasis is given to motion of rotation as to motion of translation.

It is only possible in a work of this kind, in which so many sections of the subject are dealt with, to give a comparatively short account in each case, but a good attempt is made to present to the reader a systematic treatment of the chief laws of physics. The style in which the book is written is simple and clear, and in its 768 pages there are continual references to the various memoirs, books, papers, etc., in which a student may obtain more complete information. The illustrations and printing are alike excellent.

EDWARD ARNOLD.

Number Lessons. Scheme B. Books I.–VI. With Corresponding Teachers' Books. A course of work which we can thoroughly recommend for the classes in elementary schools. The teachers' books contain useful hints as well as answers to the examples set in those prepared for the pupils.

E. J. ARNOLD AND SON.

Milton's Comus. Edited by Thomas Page. This is a third and revised edition of a well-known book. Mr. Page's exhaustive annotation and appendices are everything that could be desired. Students who have not access to all the authorities on Milton and his works may trust the author with confidence, for he has selected and included practically all that they need to appreciate the work to the full.

Organised Games. By Frank Elston. The games explained and illustrated in this book are thoroughly practicable for either hall or playground. Boys and girls may take part in them. The sub-title, "Play to the Whistle," is a suggestive one.

T. A. BARREIRO Y RAMOS.

Annales de Instrucción Primaria. This is a bi-monthly publication, running into over two hundred pages. We have already seen several numbers, and the later ones appear quite to maintain the standard set by the earlier ones. The issue for November and December, which now lies before us, contains amongst other things an interesting article on the influence in Uruguay of Herbert Spencer's ideas on education, articles on the school in its relationship to the home life and the life of the community, and on the limitations in the application of abstract principles of psychology to the problems of education. A large part of the *Annales* is devoted to practical pedagogics. It contains a capably-written article on the teaching of mathematical subjects in the primary schools and hints on object-lesson teaching. All official documents, circulars, and projects of educational reform appear in this publication, which forms thus a *vademecum* of education in Uruguay.

GEORGE BELL AND SONS.

The York Readers. Infants and Preparatory I. In these two Readers, which are splendidly printed, illustrated, and published, the writer's aim to present matter that will encourage observation in young children has been carried out in an excellent way. The language is simple and conversational in style. Several examples of memory drawing are included, as well as lists of useful words for recapitulation.

Concise Latin Course. Marchant and Spencer. A first year's course for junior forms, going as far as the end of the regular and the commoner irregular verbs. The book is an abbreviation of Bell's *Illustrated Latin Course*, which is perhaps the best elementary Latin book now in use. Practically all the exercises are continuous stories, even in the beginning of the book. The *Concise Course* has added to each exercise a few mottoes and short sayings to be learned by heart.

New School Arithmetic. By Charles Pendlebury, M.A. This is practically a revised edition of the *Arithmetic* written by the same author eighteen years ago. The exercises have undergone a few changes in the direction of substituting problems for pure calculations, and the explanatory matter is improved by the free use of diagrammatic illustrations. The arrangement is somewhat modified. Contracted methods are advocated, and the metric system receives adequate notice. We are sure that these improvements will guarantee the continued popularity of this excellent school text-book.

The book is also published in two parts, and the exercises are also published separately.

BLACKIE & SON, LTD., OLD BAILEY, LONDON, E.C.

Recitations for Infant Schools. Compiled by Margaret Riach, L.L.A. The five small books we received some months ago are now presented in one book, thus forming a collection of over 150 recitations. Teachers will find this book very useful, containing the poems of such well-known writers as T. Cooper, Emily H. Miller, Gabriel Setoun, &c. All the best Infant Recitations are contained in the collection.

English School Texts. Edited by W. H. D. Rouse, Litt.D. **Richard Hawkins**: "Voyage into the South Seas"; **Washington Irving**: "Companions of Columbus"; **Defoe**: "Journal of the Plague." These three little books promise very well for the series of which they form a part. In each one we have good literature and a thrilling story, full of information—just the thing to help to direct the youthful mind towards good reading. In schools where such books cannot be read as part of the English course, these might well be added to the school library. *Hawkins' Voyage*, in particular, is a fascinating tale of a most interesting period of history.

Landmarks of European History. By E. H. M'Dougall, M.A. "The English schoolboy is far too ignorant of European history," says the author. With this dictum we heartily agree, and therefore we welcome this book. The writer deals with various great historical movements—for example, the Papacy; the growth and fall of Napoleon's power; and by thus eliminating the relatively unimportant, is able to discuss each subject with comparative completeness. The topics have been carefully chosen, and the book is well written. Used, as it is intended to be, in conjunction with class lessons, it will be found very useful in upper classes, especially in cultivating breadth of view. The footnotes are particularly good.

British History in Review. By M. MacArthur. One of the most useful exercises the study of history provides is the systematic analysis of causes and effects, and the digest into

LONDON UNIVERSITY MATRICULATION

AT THE JUNE EXAMINATION, 1905

187

SUCCESSES HAVE BEEN GAINED BY

University Correspondence College Students

FREE MATRICULATION GUIDE

With Papers set at London University, June 1905, and

ARTICLES ON TEXT-BOOKS

FREE GUIDES TO THE HIGHER EXAMINATIONS

From THE SECRETARY (Univ. Corr. Coll. London Office), 32 Red Lion Square, Holborn, W.C.

MANCHESTER

Correspondence College.

PHYSIOGRAPHY.
MATHEMATICS.
CHEMISTRY.
SOUND, LIGHT, AND HEAT.
MAGNETISM AND ELECTRICITY.
MECHANICS.
PHYSIOLOGY.
HYGIENE.
NATURE STUDY.
BOTANY.
ZOOLOGY.
BIOLOGY.

Correspondence tuition is given in the subjects enumerated for the **BOARD OF EDUCATION (S.K.), MATRICULATION, INTERMEDIATE SCIENCE, SCHOLARSHIP, CERTIFICATE, A.C.P., L.L.A.,** and other examinations. Prospectus, with full particulars of Prizes ranging in value from 5s. to £5, will be sent on application. Intending students should join at once.

TERMS—S.K. (20 lessons) Elementary, 10s.; Advanced, 15s.

Address—Secretary, Manchester Corr. College, 58 Grosvenor Street, Manchester.

Evening Kindergarten Lectures.

Home and Colonial Training College,
HIGHBURY HILL HOUSE,
HIGHBURY, N.

LECTURES are given at the above College on the Kindergarten Gifts and Educational Handwork prescribed by the Syllabus of the National Froebel Union for 1906.

The Lectures will recommence on ***Wednesday, September 20th.*** Fees, payable in advance, ***30s.*** per course (September 1905 to July 1906), or ***12s. 6d.*** per term.

Courses have also been arranged for the study of the other subjects necessary for the N.F.U. Certificates.

Further particulars can be obtained from—

Miss D. FITCH,
Wellfield, Duke's Avenue, Muswell Hill, London, N.

THE SCHOOLMISTRESS

WEEKLY PRICE ONE PENNY. CONTAINS **HELPFUL ARTICLES ON ALL BRANCHES OF SCHOOL WORK.** WEEKLY PRICE ONE PENNY.

TEACHERS not already Subscribers should order from their Newsagent, or forward Postal Order or Halfpenny Stamps to **HOWARTH BARNES, 149 Fleet Street, London, E.C.**

SUBSCRIPTIONS (Prepaid).
ONE SHILLING AND NINEPENCE for THREE MONTHS.
THREE SHILLINGS AND THREEPENCE for SIX MONTHS.
SIX SHILLINGS for TWELVE MONTHS.
— Post Free. —

The Best Paper for Pupil Teachers and all Mistresses.
Full Notes on Certificate Literature.

TELEGRAPHIC ADDRESS: "SCHOOLMISTRESS, LONDON."

Address:
HOWARTH BARNES,
149 Fleet Street, LONDON, E.C.

Teachers and School Managers should send for Specimen Cards of Joseph Gillott's School Pens—for 74 years the best.

The public has learned to associate the name of Joseph Gillott on a pen as the standard of highest excellence. There are Hundreds of varieties, to suit all hands.

In Sixpenny and Gross Boxes, of Stationers, &c., and from W. H. Smith & Son's Bookstalls. **Sample Card of School Pens** free on receipt of Penny Stamp for postage. **Sample Box of Thirty Pens, assorted,** for testing, Seven Stamps.

JOSEPH GILLOTT & SONS, 37 Gracechurch St., London, E.C.

summaries of lengthy and sometimes involved accounts. As the young student rarely does this satisfactorily, it has been done for him in the book before us, which provides him with a clear chart wherewith to steer his course.

Emerson's Select Poems. Emerson's poems are not so well known as his prose essays, although many of them are worthy of careful study. A few of the gems are collected in this book, with sufficient explanatory notes, and a thoughtful note on the author.

ADAM AND CHARLES BLACK.

Théophile Gautier: Prose et Vers. Edited by F. B. Kirkman, B.A. (Oxon.). **Le Baron de Fourchevif: Comedie en un Acte,** par MM. Labiche et A. Jolly. Edited by A. H. Smith, M.A., L.-ès-Lettres (Paris). These two volumes of the publishers' French *Cours moyen et supérieur* contain bright and varied reading for senior pupils. A few explanatory notes are given at the end of the book, but no vocabularies.

Mon Livre de Lectures. Studies in Prose and Verse for Elementary Forms. Edited by F. B. Kirkman, B.A. (Oxon.), Examiner to the Oxford and Cambridge Joint Boards. This book is intended for use in about the third year of instruction. The stories in prose in the first part were, with a view to gaining the necessary simplicity of language, specially written by Mme. Charleville. Those in the second part are more difficult, and are taken from a reading book by M. A. Veasiot. Notes in English on the meaning of the text are appended, and there is a full vocabulary. Notes on the historical and other allusions are in French. Twenty-six illustrations accompany the text. It is suggested that these should be reproduced on large wall sheets by the artist of the class, in order to make them available for purposes of conversation. The book is in every way an admirable production. The stories are well written, sensible, and interesting. They should not only increase the pupil's power of reading French with ease, but should incite him to further reading.

Petites Comédies. By Mrs. J. G. Frazer. This consists of three little plays for acting or for reading. They are written in modern idiomatic French, and will be useful for rather more advanced students than the title of the series—*Cours Elémentaire*—would suggest.

Premières Lectures. By F. B. Kirkman. We can heartily recommend this book to all who are teaching elementary French. It proceeds on the direct method, uses pictures, and introduces names of familiar objects. The conversational exercises on the reading passages are particularly valuable.

Trois Récits de Froissart. Modernised by Marguerite Ninet. In adding this little book to the *Cours moyen et supérieur*, Mademoiselle Ninet has done a great service to French teachers. Froissart's *Chronicles* contain any number of interesting episodes, but the original text is unsuitable for ordinary class work.

BOARD OF EDUCATION.

Japanese Colour Prints. By Edward F. Strange. This is one of the series of art handbooks issued by the Board of Education in connection with the treasures contained in South Kensington Museum.

Mr. Strange has performed his task in a thoroughly efficient manner, and has given us a great deal of information, and a wealth of illustration on this most interesting subject.

He gives a historical and critical account of each of the great schools of Japanese engraving, from an artistic and technical point of view. The eighty-four full-page plates are all taken from original examples in the National Art Library, which contains an immense amount of material well worthy of study. To students of Japanese art this handbook will be invaluable, providing not only with typical examples of the best styles of Japanese work, but also explaining the methods of production and reproduction.

CASSELL AND COMPANY, LIMITED.

Cassell's Physical Educator. By Eustace Miles, M.A., author of *Muscle, Brain, and Diet*, etc. Illustrated by diagrams, photographs, and drawings. Every boy in his teens has a more or less severe attack of the mania for physical development. It is not a disease, but merely a natural instinct. The worship of muscle is as legitimate as that of brain; each has its season, and both are needed to produce a complete man in the long run. The duty of all who have boys to deal with is to direct this muscle-worship into sound practical lines, so that the outcome may be health and strength rather than waste and strain. This book comes as a valuable assistant in this matter. The writer treats of every aspect of physical education, passive and active, and writes for people of all sorts and conditions. He is frequently somewhat vague, but only where precise rules are apt to be a hindrance. He is always interesting, and full of common sense rather than fads. We commend the book to all teachers, both for their own sake and for the sake of those under their charge.

W. AND R. CHAMBERS, EDINBURGH AND LONDON.

Four-Figure Mathematical Tables. By C. G. Knott, D.Sc. A very useful set of tables, comprising Logarithms, Antilogarithms, Natural and Logarithmic Sines, Cosines, Tangents, Powers of Numbers, Exponential Functions, together with a useful table of numbers and constants. They are clearly printed on good paper, and issued at a low price.

Chambers's Latin Dictionary. Latin-English and English-Latin. (444+363 pp.) This dictionary is issued as part of Chambers's Educational Course. We are sure the book will be welcomed by many to whom the existing dictionaries were too costly. Naturally, with the compression which is necessary, we have not the usual references to passages of classic authors, but the book will be found to be a complete vocabulary to all the generally read classics. A useful feature is that the quantities are given to every word. There is a very good dictionary of proper names. On the whole, a very handy and convenient little book.

MACMILLAN & CO., ST. MARTIN'S ST., LONDON, W.C.

New Globe Reader. Infant Reader No. II. This Reader will be found very suitable for the children. The type is clear, the pictures interesting, and each story is written to introduce words taught in the building lesson. The word-building exercises found at the end of the book are presented in two colours, which will aid the little learner.

T. NELSON & SONS, LONDON AND EDINBURGH.

Nelson's New Drawing Course. By J. Vaughan, Set V. These excellent drawing cards are drawn up on sound lines, whether considered from the point of view of art or of education. They are printed on both sides—one in outline and the other in colour. Thus there are two principal studies on each sheet, with correlated studies of smaller size adapting the subject to brush, and ruler drawing and clay and cardboard modelling. We cannot speak too highly of the educational value of this series.

GEORGE PHILIP & SON, LIMITED, LIVERPOOL AND LONDON.

A Book of Song Games and Ball Games, adapted for School Use. By Kate F. Bremner, Infant Mistress, Albion Road School, Edinburgh.

Naas in Sweden is a name which probably suggests at first merely woodwork of the type known as Sloyd. To those who have studied there, at one of the summer courses for foreign teachers, it suggests inspiration towards all that is best in education. The breadth of view of the Director, Mr. Salomon is exemplified in the institution of a now famous Games course, in which both native and visiting teachers learn how to play the old children's games of Sweden, and so use them for the brightening of school work, which is as much as to say for the furtherance of real education. In this Games course is the genesis of this book. The games and the music are those of Sweden, but the words are the words of Miss Bremner. The reason for this is clear. The "love *motif*" is too prominent in those Swedish games to suit English taste. Hence, instead of translating, the author has written simple tuneful child-like verses, with not too much meaning to hamper the games. The result is admirable. The children who practise these games enjoy them keenly, and gain in the development of taste, grace of movement, and pleasure in at least one part of their school day. Not only infant teachers but all teachers will find the book a treasure-house full of good things. The numerous photographs and diagrams are of great service in explaining the movements of the games. The book is artistically produced throughout. A preface by Mr. Salomon embodies his benediction on the venture, which will certainly meet with a cordial reception.

WORKS BY JOHN CARROLL

Art Master and Examiner in Drawing.

JUST PUBLISHED. Crown 8vo, cloth, 2s. 6d.

Drawing from Models and Objects

A Handbook for Teachers and Students in Training.

Prospectus with Specimen Plate sent free on application.

Practical Geometry for Art Students

A New Edition, in which the examples dealing with Practical SOLID Geometry have been entirely remodelled. The projections of points, lines, and traces, &c., have given place to those of SIMPLE OBJECTS, the latter being of more practical use to the Art Student. **1s. 6d.**

KEY TO CARROLL'S GEOMETRY. 1s. 6d.

PATTERN DRAWING AND DESIGN.

The Application of Geometrical Drawing to the Construction of Ornament and the Planning of Patterns. Crown 8vo, cloth. **1s. 6d.**

FREEHAND DRAWING OF FOLIAGE, FLOWERS, AND FRUIT.

Consisting of 24 Reproductions of Photographs from Nature by WM. J. CARROLL. Arranged in graduated order, with directions to the Student, and Illustrated by 46 Analytical Diagrams of Construction by JOHN CARROLL. Demy 4to (11 by 8 in.). In stiff wrapper. **1s. 6d.**

FREEHAND DRAWING OF ORNAMENT.

Consisting of 24 Photographic Reproductions of Examples of Flat Ornament, and 66 Analytical Diagrams of Construction, designed and arranged in graduated order, with directions to the Student as to the method of proceeding. Demy 4to (11 by 8 in.). In stiff wrapper. **1s. 6d.**

Catalogue of School Books, Stationery, and General School supplies post free on application.

BURNS & OATES, 28 Orchard St., London, W.

THE ... SATURDAY WESTMINSTER

THE LARGEST AND BEST . . .
PENNY MAGAZINE-REVIEW . .
PUBLISHED FOR INTELLIGENT,
CULTURED READERS. . . . .

PRIZES

are offered Weekly in connection with Competitions of a literary nature. Always original and interesting, and often novel in ideas, the PROBLEMS AND PRIZES page affords pleasure and recreation to a very wide reading public.

THE SATURDAY WESTMINSTER can be obtained through all Newsagents and Book-stalls, or post free 1½d. weekly, for any period, from THE PUBLISHER, Tudor House, Tudor St., London, E.C.

DELICIOUS COFFEE

RED WHITE & BLUE

FOR BREAKFAST & AFTER DINNER.

In making, use less quantity, it being so much stronger than ordinary COFFEE.

England's Best Value

"BONGOLA" TEA

Has no Equal

THE AMERICAN SCHOOL & COLLEGE TEXT-BOOK AGENCY

ARE AGENTS FOR

AUGSBURG'S DRAWING. (Adopted by London County Council).
AMERICAN EDUCATIONAL JOURNALS.
PERRY (and other) PICTURES.
BLACKBOARD STENCILS.
AMERICAN TEXT-BOOKS ON NATURE STUDY, PEDAGOGICS, &c. &c.

Catalogues and Lists on application to 10 Avondale Road, Croydon.

LANTERN SLIDES, BEST .... WET-PLATE

Geography, Science, Art, History, &c.

List Free from WILSON, LOCHHEAD, ABERDEEN.

The Best, Most Useful, and Cheapest Dictionary Extant.

NELSON'S

Royal English Dictionary.

714 Pages. Price 1s. net.

T. NELSON & SONS, 35 & 36 Paternoster Row, London, E.C.; Edinburgh; Dublin; and New York.

Thomas Nelson & Sons'

Royal School Series

Adopted by the leading Council Schools.

The Royal King Infant Series

Introductory to Nelson's Royal "Prince" and "Princess" Readers (see below). Beautifully Illustrated in Colour.

Royal King Primer I. . . . . 3d.	**Royal King Infant Reader I. . . 5d.**
Royal King Primer II. . . . . 4d.	**Royal King Infant Reader II. . . 6d.**

Royal King Infant Reader III. . . 7d.

This is the only series of Infant Readers which presents a thorough and careful *gradation*. The books are graded in difficulty, in size, and in price—features which will be much appreciated by those who use them. The type has been specially selected for its clearness and balance of parts. The books are profusely illustrated in colour and in black and white.

Nelson's Royal King Primer Reading Sheets

Corresponding to the Reading Pages of the "Royal King Primer I."

Printed in Two Colours on Strong Manilla Paper. Mounted on Roller to turn over. Twenty-two Sheets, price 12s. 6d.

Also supplied on Linen, with Metal at Bottom, price 25s.

The type used has been specially designed for these sheets, with a view to **avoid all strain** on the eyes of young readers, and at the same time to preserve the **proportions of letters and spaces** which are recognised as most graceful. In these respects it is superior to anything hitherto used on Wall Sheets. The Pictures are reproduced with a special view to **simplicity** and **clearness**.

The Royal Princess Readers

Book I. . . . . 8d.	**Book IV. . . . . 1s. 3d.**
Book II. . . . . 10d.	**Book V. . . . . 1s. 6d.**
Book III. . . . . 1s.	**Book VI. (Literary Reader No. 1). 1s. 6d.**

Book VII. (Literary Reader No. 2) . 2s.

The matter is distinguished for its vivacity, its literary quality, and its happy freshness. The **Illustrations** are of remarkably high quality, and comprise not only many well-executed pictures in black and white, but numerous plates in full colour exquisitely reproduced. Alike in letterpress, illustration, paper, printing, and binding, **The Princess Readers** touch the high-water mark of school books.

"I consider them to be the best Readers out." "Both teachers and scholars are delighted with them."
"They will make friends wherever they go."

"Princes among School Readers."—*Schoolmaster.*

The Royal Prince Readers

Book I. . . . . 8d.	**Book IV. . . . . 1s. 3d.**
Book II. . . . . 10d.	**Book V. . . . . 1s. 6d.**
Book III. . . . . 1s.	**Book VI. (Literary Reader No. 1). 1s. 6d.**

Book VII. (Literary Reader No. 2) . . 2s.

In this New Series of high-class School Readers the matter is remarkably fresh; the books are distinguished for their literary quality and careful grading. The **Illustrations** are works of art, and comprise not only many well-executed pictures in black and white, but numerous plates in full colour. Alike in letterpress, illustration, paper, printing, and binding, **The Prince Readers** have absolutely no superiors in the market. They may be confidently recommended.

"Second to none." "Delighted with them." "All classes revel in them."

Literature for the Seniors. To follow the "Royal Prince" and "Royal Princess" Readers.

Nelson's Literature Readers.

Arranged and Annotated by DR. GARNETT, *late of the British Museum.*

No. 1. Beautifully Illustrated. Price 1s. 6d. No. 2. Price 2s.

***** School Circular and Educational Catalogue post free on application.**

THOMAS NELSON & SONS, 35 & 36 Paternoster Row, London, E.C.; Edinburgh; Dublin; and New York.

THE WORLD AND ITS PEOPLE.

A SERIES OF MODERN GEOGRAPHICAL READERS, ADAPTED TO THE SPECIMEN SCHEMES OF THE BOARD OF EDUCATION, VIVIDLY WRITTEN FROM RECENT SOURCES OF INFORMATION, AND SUPERBLY ILLUSTRATED WITH A PROFUSION OF COLOURED AND OTHER PLATES, MAPS, PLANS, &c.

Just Ready. **"THE BRITISH EMPIRE."** *16 Coloured Plates, 1/10.*

A Head Teacher writes:—

"Permit me to express my extreme appreciation of these very delightful and unique Readers . . . my pupils are most enthusiastic about them."

FIRST STEPS IN GEOGRAPHY.
144 pages. 8 Coloured Plates. Price 10d.

SEA AND LAND.
160 pages. 8 Coloured Plates. Price 1s.

ENGLAND AND WALES.
208 pages. 8 Coloured Plates. Price 1s. 3d.

EUROPE.
272 pages. 16 Coloured Plates. Price 1s. 6d.

AMERICA.
286 pages. 8 Coloured Plates. Price 1s. 6d.

AFRICA.
292 pages. 8 Coloured Plates. Price 1s. 6d.

AUSTRALASIA.
244 pages. 6 Coloured Plates. Price 1s. 6d.

ASIA.
360 pages. 16 Coloured Plates. Price 1s. 6d.

THE BRITISH ISLES.
304 pages. 16 Coloured Plates. Price 1s. 6d.

THE WORLD.
416 pages. 32 Coloured Plates. Price 2s.

The Principal of a College writes:—

"I am delighted with the Readers, and shall recommend them right and left. . . . The illustrations are such works of art."

A Head Teacher writes:—

"Delighted with the 'World and its People.' The summary of facts appended is the most useful I have met in any book, and doubles the value of each Reader."

A Director of Education writes:—

"I think your firm is to be congratulated upon the publication of this excellent series of Geography Readers, which for clearness of description and illustration is of a very superior nature."

☞ *An Inspector of Schools writes:*—"They are delightful books. I wish that such Supplementary Readers could be placed in all our Schools. They would do much to make the Study of Geography interesting, useful, and Educational."

*** Complete Educational Catalogue, post free, on application.

THOMAS NELSON & SONS, 35 & 36 Paternoster Row, London, E.C.; Edinburgh; Dublin; and New York.

THE UNIVERSITY TUTORIAL PRESS

GENERAL EDITOR: WM. BRIGGS, LL.D., M.A., B.Sc., F.C.S., F.R.A.S.

SCIENCE AND ART

EXAMINATIONS: BOARD OF EDUCATION.

I.—**Practical Plane and Solid Geometry, First Stage.** By G. F. Burn, A.M. Inst. M.E. Second Edition. **2s.**

III.—**Building Construction, First Stage.** By Bryson Cunningham, B.E., Assoc. M. Inst. C.E. **2s. 6d.**

V.—**Mathematics, First Stage.** Containing all the Algebra and Euclid required. Edited by Wm. Briggs, LL.D., M.A., F.R.A.S. **2s.**

VIa.—**Mechanics (Solids), First Stage.** By F. Rosenberg, M.A., B.Sc. Fifth Edition. **2s.**

VIb.—**Mechanics of Fluids, First Stage.** By G. H. Bryan, Sc.D., F.R.S., and F. Rosenberg, M.A., B.Sc. Second Edition. **2s.**

VIII.—**Sound, Light, and Heat, First Stage.** By John Don, M.A., B.Sc. **2s.**

IX.—**Magnetism and Electricity, First Stage.** By R. H. Jude, M.A., D.Sc. New Edition, Revised. **2s.**

X.—**Inorganic Chemistry (Theoretical), First Stage.** By G. H. Bailey, D.Sc., Ph.D. Heidelberg. Edited by Dr. Wm. Briggs, M.A., B.Sc., F.C.S. Second Edition. **2s.**

Xp.—**Inorganic Chemistry (Practical), First Stage.** By F. Beddow, Ph.D., D.Sc. Second Edition. **1s.**

XIp.—**Organic Chemistry (Practical).** (For the First and Second Stages.) By George George, F.C.S. **1s. 6d.**

XVII.—**Botany, First Stage.** By A. J. Ewart, D.Sc., Ph.D., F.L.S. **2s.**

XX., XXIa.—**Modern Navigation.** (For the First and Second Stages.) By William Hall, B.A., R.N. **6s. 6d.**

XXII.—**Steam, First Stage.** By J. W. Hayward, M.Sc. **2s.**

XXIII.—**Physiography, First Stage.** By A. M. Davies, A.R.C.S., B.Sc., F.G.S. **2s.**

XXV.—**Hygiene, First Stage.** By R. A. Lyster, M.B., B.Sc., D.P.H. Third Edition. **2s.**

MATRICULATION:

LONDON UNIVERSITY.

Algebra, The New Matriculation. Containing a Section on Graphs. By Rupert Deakin, M.A. Lond. and Oxon. **3s. 6d.**

Arithmetic, The Tutorial. By W. P. Workman, M.A., B.Sc. Second Edition. **4s. 6d.** Key, **5s. 6d.** net.

Botany, The New Matriculation. By A. J. Ewart, D.Sc., Ph.D., F.L.S. **3s. 6d.**

Chemistry, The New Matriculation: Containing in one volume all the Chemistry required for London Matriculation, including the Facts relating to the Chemistry of Daily Life. By G. H. Bailey, D.Sc. Lond. Edited by Wm. Briggs, LL.D., M.A., B.Sc., F.C.S. Second Edition, Rewritten and Enlarged. **5s. 6d.**

English Course, Matriculation. By W. H. Low, M.A. Lond., and John Briggs, M.A. Camb., F.Z.S. **3s. 6d.**

Euclid, Books I.-IV. By Rupert Deakin, M.A. Oxon. With a Preliminary Course of Drawing and Measurement, and Problems in Practical Geometry. **2s. 6d.**

French Course, The Matriculation. By Ernest Weekley, M.A. Lond. and Camb. **3s. 6d.** Key, **2s. 6d.** net.

French Reader, The Matriculation. Containing Prose, Verse, Notes, and Vocabulary. By J. A. Perret. **2s. 6d.** Key, **2s. 6d.** net.

Latin Authors, Matriculation Selections from. By A. F. Watt, M.A. Oxon., and B. J. Hayes, M.A. Lond. and Camb. **2s. 6d.** Key, **2s. 6d.** net.

Mechanics, The Matriculation. By Wm. Briggs, LL.D., M.A., and G. H. Bryan, Sc.D., M.A., F.R.S. **3s. 6d.** Key, **3s. 6d.** net.

Modern History, Matriculation. 1485-1901. By C. S. Fearenside, M.A. Oxon. **3s. 6d.**

Physics, Matriculation: Heat, Light, and Sound. By R. W. Stewart, D.Sc., and John Don, M.A., B.Sc. **4s. 6d.**

TEACHERS' CERTIFICATE, 1906

NEW BOOKS

SECTION B.—THE PRINCIPLES OF EDUCATION.

School Training. (For the Certificate Examination.) By R. E. Hughes, M.A., Author of "The Making of Citizens." **2s.**

School Organisation. (For the Certificate Examination.) By S. E. Bray, M.A., Inspector of Schools to the London County Council. **2s.** *[Ready.*

Principles and Methods of Teaching. (For the Certificate Examination.) By S. S. F. Fletcher, Ph.D., M.A., Vice-Principal of the Cambridge University Day Training College, and J. Welton, M.A., Professor of Education in the University of Leeds. *[In preparation.*

The Educational Ideas of Froebel. By J. White, D.Sc. **1s.**

The Educational Ideas of Pestalozzi. By J. A. Green, B.A., Professor of Education at University College, Bangor. **1s.**

SECTION I.—GENERAL ELEMENTARY SCIENCE.

Part I.—**Physiography.** Edited by R. W. Stewart, D.Sc. **3s. 6d.**

Part II. (*a*)—**Biology.** By W. S. Furneaux, F.R.G.S. **2s. 6d.**

Part II. (*b*)—**School and Home Hygiene.** By R. A. Lyster, M.B., B.Sc., D.P.H. **1s. 6d.**

KING'S SCHOLARSHIP, 1906

NEW BOOKS

ENGLISH LANGUAGE AND HISTORY.

Our Mother Tongue. A Grammar and History of the English Language. By H. M. Hewitt, M.A., LL.M., and George Beach, M.A., LL.D. Twelfth Edition, largely Rewritten and Rearranged. **3s. 6d.**

Shakespeare—Much Ado About Nothing. Specially Edited for this Examination. By E. J. Thomas, M.A. **1s. 6d.**

Bacon—The Selected Essays for 1905. Specially Edited for this Examination. By A. F. Watt, M.A. **6d.**

The Scholarship History of England.

1. **To 1603.** By M. E. Carter, Somerville College, Oxford, First Class Honours in Modern History. **2s.**
2. **Special Period for 1905 and 1906. 1487-1558.** By C. S. Fearenside, M.A. Oxon., and J. W. Horrocks, M.A. Lond., F.R.Hist.S. **2s.**

ELEMENTARY SCIENCE.

Section 1.

Scholarship Elementary Science. General, for Section 1. Edited by R. Wallace Stewart, D.Sc. Lond. **2s.** *[Ready.*

Section 2.

(*a*) **Scholarship Chemistry.** By H. W. Bausor, M.A. Camb. **1s. 6d.** *[Ready.*

(*c*) **Scholarship Biology. 1s. 6d.** *[Ready September.*

List of Books for LONDON MATRICULATION, KING'S SCHOLARSHIP, TEACHERS' CERTIFICATE, SCIENCE AND ART (Board of Education), including Books for the SECOND STAGE, and other Examinations, Post Free on Application.

LONDON: W. B. CLIVE, UNIVERSITY TUTORIAL PRESS WAREHOUSE, 157 DRURY LANE, W.C.

COUPON
PRACTICAL TEACHER
September 1905

Printed and Published by Thomas Nelson & Sons, Proprietors, at the Office of "The Practical Teacher," 35 & 36 Paternoster Row, London, E.C.